

Stroke units in low and middle income countries (LMICs) save lives: application of the western model of stroke care

Omotayo Taiwo, Min K Koko and Eluzai Hakim

Author Affiliations:

Stroke Unit, University Hospitals,
Dorset, UK

Correspondence:

Eluzai Hakim.
eluzaihakim@gmail.com

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ABSTRACT

Stroke is defined as a syndrome of rapidly developing clinical signs of focal or global disturbance of cerebral function with symptoms lasting 24 hours or longer or leading to death with no apparent cause other than of vascular origin. In the current management of stroke in developed countries, stroke units form a vital part of the care pathway. Stroke units save lives, reduce disability, mitigate against complications such as aspiration pneumonitis, facilitate early discharge home with timely interventions by a Multidisciplinary Team. Whilst the burden of stroke has decreased in high income countries, this decrease is lowest in sub-Saharan Africa.

Key words: stroke units, low and middle-income countries, multidisciplinary team, reduced mortality, ideal stroke units.

Introduction

Stroke is defined as a syndrome of rapidly developing clinical signs of focal or global disturbance of cerebral function with symptoms lasting 24 hours or longer or leading to death with no apparent cause other than of vascular origin.^[1]

Although stroke used to be considered a rare disease in Africa,^[2] it is a common condition with an annual incidence of 250-316 per 100,000 of population and a prevalence of 560 to 1,460 per 100,000 of population. In the last 40 years, mortality due to stroke is reported to have fallen by 42% in high income countries whereas in Africa and other low- and middle-income countries (LMICs), it has risen by 100%.^[3,4] The African population accounts for 1.256 billion of the 7.5 billion world population,^[5] which will inevitably translate to a huge rise in the incidence and prevalence of stroke.

Sub-Saharan Africa will account for approximately half of the world population by 2050.^[6] In addition to infectious diseases, accidents and war-associated injuries, a corresponding increase in health services to cope with this surge in population growth is imperative. Stroke is estimated to be the second most common cause of death in the world and 7th cause of disability,^[7,8] but there is no known treatment

which can be administered at the onset for most people suffering a stroke.^[8] In developed countries, stroke units are established central components of modern stroke services^[9] being able to deliver reperfusion treatment including thrombolysis for those with ischaemic strokes and thrombectomy if needed, with the collaborative support of a Multidisciplinary Team (MDT) will help improve the outcomes.

Benefit of stroke units in low and middle-income countries

The benefit to patients treated in stroke units is highly significant and this extends to both younger (< 75 years) and older patients (> 75 years) who have suffered ischaemic or haemorrhagic strokes. Those treated in stroke units are more likely to survive, gain independence and be discharged home compared with care in a general medical ward.^[10,11]

To answer the question whether stroke units can be effective in LMICs, Langhorne et al^[9] identified and reviewed several studies from five continents and concluded that all noted statistically significant lower death rates in many studies in the stroke unit group compared with the controlled group. Information was scarce for other outcomes such as discharge home or recovery of independence. In studies comparing interventions for stroke based on a district hospital of one million people suffering 2,500 strokes per year,^[9] stroke units offered the greatest number of extra independent survivors (Figure 1).

It is therefore imperative that sub-Saharan countries set up stroke units to increase the number of survivors. In addition, the stroke units would act as focal points for collecting more data such as early discharge and recovery of independence.

We propose that stroke units are established in a geographical unit within hospitals to improve patient care in the acute stage of the illness and enable healthcare professionals to monitor physiological parameters such as blood pressure, blood sugar, state of hydration, oxygen saturation, core temperature and offer preventive measures against pulmonary thromboembolism and aspiration pneumonia by early provision of intermittent pneumatic compression to prevent deep vein thrombosis and assessment of swallowing to mitigate against aspiration pneumonia. When available, thrombolysis and thrombectomy could be offered early if patients are admitted to a stroke unit. Secondary prevention can also be initiated early and with an opportunity to organise rehabilitation and orderly transfer to the community.

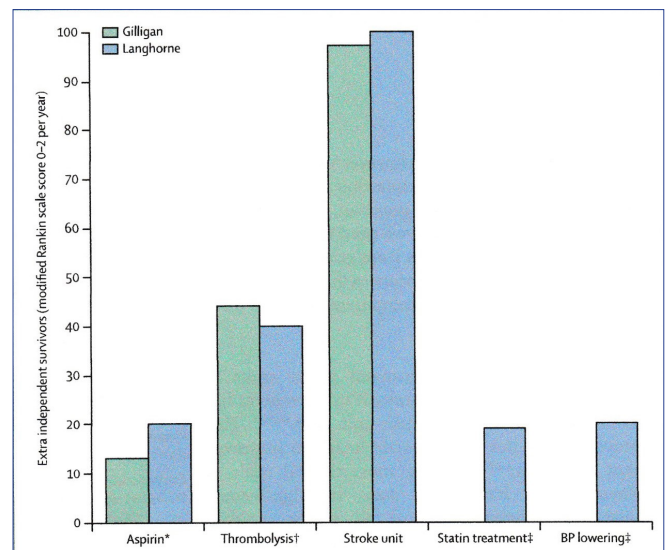


Figure 1. Potential population effect of stroke interventions in a district of one million population. The population effect is shown for a hypothetical district of 1 000 000 population with 2500 strokes per year. Estimates are shown for the number of extra independent survivors (modified Rankin scale score 0–2 points) resulting from an intervention for 1 year. The assumptions and calculations are detailed by Gilligan and colleagues and Langhorne and colleagues^[9]. BP=blood pressure. *Acute aspirin treatment. †0–6 h of thrombolysis. ‡Prevention. (Reproduced from *Lancet Neurology* 2012; 11:341–48 with permission of the Author, Professor Peter Langhorne)

Organisation of an ideal stroke unit

Stroke unit

The term Stroke Unit refers to the co-ordination of the multidisciplinary stroke care within a geographically defined area. The core specialities involved are usually medical doctors (stroke specialists), nursing stroke specialists and ward-based stroke nurses, speech and swallowing therapists, physiotherapists, occupational therapists, dieticians, social workers, orthoptists, clinical psychologist, discharge-coordinators and the stroke research team.

Types of organised stroke unit service tested in trials

1. Acute / Hyper acute stroke unit -This unit offers stroke care during the initial hours to days following a stroke. Patients are admitted immediately after undergoing an emergency CT scan.
2. Rehabilitation stroke unit – Individuals are admitted to this unit approximately 1-2 weeks after a stroke, engaging in rehabilitation that extends for weeks to months as needed. Patients

initially admitted to an acute stroke ward might transition to this unit after 1-2 weeks.

3. Comprehensive stroke unit – This unit combines acute care and rehabilitation, embodying the optimal setting for stroke care.

Proposal for a stroke unit

A. Physical Structure

- An acute geographical unit with 6 to 8 hyper acute beds equipped with monitoring facilities offering care in the first 72 hours.
- A 10-bed step down ward linked to the acute beds.
- An adjoining stroke rehabilitation unit of 10 beds.

B. Staffing

- Consultant with training and interest in Stroke Medicine.
- Registered Nurses.
- Therapists (Physiotherapists, Occupational Therapists, Speech and Language Therapists, Dieticians).
- Care assistants / Nurse Auxiliaries
- Ward Administrative staff such as Ward Clerks.
- Cleaners and Housekeeping staff.
- Staffing to cover all shifts round the clock.

C. Equipment

- Basic Physiotherapy equipment.
- Occupational Therapy kitchen.
- Multidisciplinary Team (MDT) meeting room.
- Computers

D. Processes

- Guidelines (may be adopted from well-established units in developed countries and adapted to local circumstances).
- Regular MDT meetings.
- Access to CT, MRI scanning.
- Liaison with other medical and surgical teams.
- Community rehabilitation teams.

Conclusion and recommendations

1. Patients with suspected strokes should be transported promptly to a hospital equipped with essential diagnostic resources and a dedicated acute stroke unit offering round-the-clock service. Upon admission, they should receive care within the stroke unit rather than a general medical ward, as stroke-specific care within a stroke unit has demonstrated superior efficacy.
2. The most important aspect of the stroke unit that saves lives is the MDT, to cater effectively for the requirements of the local stroke population. It is imperative to ensure sufficient adequately trained staff members as well as available stroke unit beds. Stroke care necessitates specialization, organization, and an MDT approach involving medical, nursing, physiotherapy, occupational therapy, speech therapy, and proficient social workers, all skilled in stroke care. Ideally, these MDTs should convene at least once a week to discuss and coordinate patient care.
3. Paramount to the management of a stroke unit is the comprehensive training of medical, nursing, and therapy staff. Offering clinical attachments, implementing training programs for staff, and facilitating scholarships can augment staffing by attracting a greater number of skilled personnel.
4. Stroke patient should receive a swallowing screening test within 24 hours of admission, those patients with evidence of dysphagia should have a formal clinical/instrumental assessment followed by swallowing management and input from dieticians for individualised nutritional therapy.
5. Early recognition of important conditions underlying stroke such as internal carotid arterial stenosis need to be detected by Doppler ultrasound scanning to indicate the need for carotid endarterectomy by vascular surgeons if significant stenosis is detected. The involvement of cardiologists in the investigation of patients with suspected foramen ovale or dysrhythmias is essential. Gastroenterologists may also be involved for the insertion of feeding tubes into patients with persistent dysphagia who need percutaneous endoscopic gastrostomies (PEG) six weeks after feeding with nasogastric tubes.
6. Enabling early discharge services from the stroke unit, supported by community rehabilitation teams, not only reduces the length of hospital stays but

also enhances rehabilitation within a home setting, ultimately fostering improved patient outcomes.

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