Cardiovascular epidemiology in Africa

Although the epidemiological pattern of cardiovascular diseases (CVDs) in sub-Saharan Africa is rapidly changing, it is still in sharp contrast to global patterns

During the last two decades, cardiovascular diseases (CVDs) have rapidly emerged as a major cause of disease and deaths in Africa. Between 1990 and 2010, hypertension caused over 500,000 deaths and 10 million years of life lost in 2010 alone. Stroke was the leading contributor to CVD-related death and disability in 2010 in sub-Saharan Africa (SSA).

Heart failure is predominantly non-ischemic, and has become a dominant form of CVD in Africa where it affects young economically active individuals. CVD death rates in Africa may still be less than observed proportions in high-income regions but on average, occur at younger ages than in the rest of the world. This curtails economic growth and poses a significant social challenge in most countries.

In the global roadmap to achieve a 25% reduction in CVD morbidity and mortality in Africa by the year 2025 as suggested by the World Health Organization, improving detection, treatment, and control of hypertension is crucial. The Pan African Society of Cardiology (PASCAR) is at the forefront of efforts to provide an appropriate response to cardiovascular epidemics in Africa through research, education, and advocacy.

A quick look back tells us that less than a century ago, Donnison (1929) from a blood pressure survey reported the extreme rarity of hypertension in Africans. Jex-Blake (1934) and Vint (1936–1937) also confirmed from clinical studies and autopsy studies respectively, that ‘essential hypertension must be exceedingly rare’ in Africans. The contrast of these observations to the current CVD figures in Africa shows how rapid the transition has occurred and calls for greater attention on the issues of CVD in Africa.
Human health in Africa has been rapidly shaped by powerful forces including population ageing, rapid urbanization with adoption of unhealthy lifestyles and, as a consequence, a larger proportion of the population is increasingly developing CVDs. Recent studies suggest the dominance of hypertension, cerebrovascular diseases, and heart failure in an environment which is still the hotspot of rheumatic heart disease (RHD).

The World Health Organization (WHO) estimates that the incidence of hypertension is highest in the African region at about 46% of adults aged ≥25 years. This compares with 35% in the Americas and other high-income countries and 40% in the rest of the world. In a systematic review that pooled data from 33 surveys involving over 110 414 participants aged on average 40 years, the overall prevalence of hypertension in Africa was 30% (Figure 1). It is estimated that the number of people with hypertension in Africa will increase by 68% from 75 million in 2008 to 126 million in 2025.

Though seen in almost all countries, the care gap related to poor utilization of evidence-based interventions for management of hypertension is most marked in Africa. Less than 30% of hypertensive patients are aware of their status, 18% are treated and only 7% are having their blood pressure controlled (Figure 1). Between 1990 and 2010, hypertension caused over 500 000 deaths, and 10 million years of life lost in 2010 alone in Africa.

Data from the global burden of disease study, indicates that stroke mortality in SSA has increased between 1990 and 2010, in contrast to the decreased mortality in developed countries. Some prospective studies from sub-Saharan Africa have reported early case fatality from stroke (up to 1 month) to be about 33%. With the projected increase in prevalence of stroke risk factors Africa is likely to be paralleled by a huge burden of stroke.

In the past few decades, heart failure has emerged as a major public health problem in Africa, imposing enormous pressure on the health care systems. The sub-Saharan Africa Survey of Heart Failure (THESUS-HF), a prospective multicentre study of HF across the continent, showed that HF in Africa is predominantly non-ischemic (Figure 2). Given the low rate of cardiac catheterization on the continent, ischemic causes could be underestimated. However, HF clearly affected relatively young patients with underlying hypertension as the most likely antecedent and resulted in a high incidence of rehospitalisation and mortality (17.8% at 6 months).

**Figure 1** Prevalence, awareness, treatment, and control of hypertension in Africa.
Source: Feven Ataklile et al. Hypertension. 2015;doi: 10.1161/HYPERTENSIONAHA.114.04394.

**Figure 2** (with courtesy of Prof Karen Sliwa): Participating centres (left lower quadrant) and main findings [Etiologies (right), general characteristics (left upper quadrant)] from The sub-Saharan Africa Survey of Heart Failure (THESUS-HF) prospective cohort study. Damasceno, A. et al. The THESUS study. Arch Intern Med 2012;172:1386–1394.
While acute rheumatic fever (ARF) has been eradicated in developed countries, ARF and its major sequel, RHD remain a public health issue in Africa. RHD is the third most important aetiology of HF in Africa (Figure 2) and has been associated with high morbidity and mortality, especially in pregnancy.

Several other challenges worsen the CVD epidemic in Africa including the acute shortage of health workforce personnel. According to the WHO, 36 SSA countries would need to increase their health workforce by about 140% to achieve enough coverage for essential health interventions. The imbalances exist in the total numbers and geographical distribution of health workers, but also in the skills mix of available health workers who are generally not trained to face the CVD epidemic. Finally, the enormous cost of CVDs to economies, individuals, and societies is remarkable. In 2010, the total cost of major CVDs in the WHO-Africa sub-region was estimated to be $11.6 billion, including $4.7 billion due to loss of productivity.

With this distinctive picture of CVD in the world, the provocative question is on how to turn the challenges into opportunities. The World Heart Federation (WHF) has launched a series of three CVD Roadmaps dedicated to hypertension, secondary prevention, and tobacco control. These Roadmaps are designed to translate existing knowledge of best practices into practical strategies for better cardiovascular health. The simplicity in their presentation makes them very appealing and easy to adapt by different low income countries, especially those in SSA where traceable clinical guidelines for CVDs including hypertension management is rare (Figure 3).

African governments have started to open political windows to be used as opportunities to develop and implement policies for the prevention and control of CVDs. In 2004, African Union (AU) in a proactive approach called hypertension one of the continent’s greatest health challenges after HIV/AIDS. An urgent need therefore exists to support ministries of health with tailored CVDs policies.
Recent hospitalization trends for acute myocardial infarction in Beijing

More than 1 million people die each year from coronary heart disease in China and the transition is to more NSTEMI myocardial infarction, as it was in western countries during the 1990s

Coronary heart disease (CHD) is a leading worldwide threat, responsible for over 8 million deaths globally each year.1 In China, 1.39 million people died of CHD in 2013, a 90.9% increase compared with 1990.2 A common manifestation of CHD is acute myocardial infarction (AMI), which is often associated with high mortality, especially during in-hospital stays in the acute phase. Therefore, information about hospitalization for AMI, such as clinical characteristics of the patients, in-hospital mortality, length of hospital stay, and in-hospital costs, is necessary for the benefit of health policy makers, hospital administrators, clinicians, and researchers.

Accumulated epidemiological studies have evidenced a substantial decrease in hospitalization rates for AMI in western populations, primarily owing to improvements in the prevention and treatment of CHD.3–5 However, few population studies on hospitalization rates for AMI have been undertaken in China. Although upward trends for the number of patients admitted for AMI have been reported by several hospital-based registries, the results are subject to selection bias.6–7

Recently, a ‘real world’ study was published using unselected city-level data from the Hospital Discharge Information System in Beijing.8 The study identified 77 943 patients admitted for AMI from 2007 to 2012 from the entire population of the city. The study found a significant increase in AMI hospitalization rates in Beijing along with a dramatic change in the pattern of AMI subtypes: a marked increase in the rate of non-ST-segment elevation myocardial infarction (NSTEMI) accompanied by a decrease in the rate of ST-segment elevation myocardial infarction (STEMI). Meanwhile, in-hospital mortality and the length of hospital stay decreased, whereas per-hospitalization and total in-hospital costs have shown a steady increase.

With an incidence of 80.5 per 100 000 population in 2007, the AMI hospitalization rate in Beijing remained at a comparatively low level compared with most western populations.3–5 Importantly however, an overall increase by 49.5% (from 80.5 to 120.4 per 100 000 population) before and by 31.2% (from 55.8 to 73.3 per 100 000 population) after age-standardization was found during the period 2007–2012. The increasing trend of overall AMI hospitalization in Beijing is in contrast to the decrease observed in western populations.3–5

One interesting finding about the rate for AMI hospitalization in Beijing was that the greatest increase occurred in the youngest age-group (<55 years) in both sexes. This is consistent with the unfavourable trends in the prevalence of cardiovascular risk factors in young and middle-aged adults in Beijing. More interestingly, the study demonstrated notable diverse trends for the hospitalization rates of STEMI and NSTEMI in Beijing: the age-standardized hospitalization rate for STEMI declined slightly from 47.3 per 100 000 population in 2007 to 40.5 per 100 000 population in 2012, but the rate for NSTEMI showed a remarkable three-fold increase (from 6.8 to 26.9 per 100 000 population). The ratio of the patient numbers for STEMI to NSTEMI decreased dramatically from 6.5:1 in 2007 to 1.3:1 in 2012; among females, the proportion of NSTEMI exceeded that of STEMI in 2012.

The transition from STEMI to NSTEMI was observed in the late 1990s in the USA9 and around 2005 in Germany10 and Ireland.4