

# Challenges of early diagnosis and prevention of cardiovascular disease in Sub-saharan Africa

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### Abstract

Cardiovascular disease (CVD) is a significant global health issue, with a particularly high burden in Africa. Recent data suggests that CVDs are responsible for about 13% of all deaths and 38% of all non-communicable disease deaths in Sub-Saharan Africa. However, the true burden of CVD in this region is often underestimated due to poor, delayed and unrecognized diagnosis.

Thoroughly assessing literature data shows that risk factors of CVD are often more prevalent in areas of poverty, low education, and uncontrolled urbanization. Early diagnosis and prevention of CVD are critical for improving patient outcomes, particularly in high-risk populations like Sub-Saharan Africa. However, resource constraints, socioeconomic disparities, and healthcare system challenges often hinder this. Collaborative initiatives and a multi-faceted community engagement approach are essential

to addressing these challenges and could help ensure the effective management of CVD in Africa.

**Keywords:** Sub-Saharan Africa, Cardiovascular Diseases, Early Diagnosis, Challenges.

**Conflict of interests:** none declared.

Received: 30.05.2024

Accepted: 11.07.2024



**For citation:** Eteneneng E.J. Challenges of early diagnosis and prevention of cardiovascular disease in Sub-saharan Africa. *International Heart and Vascular Disease Journal*. 2024. 12(43):33-40. DOI: 10.24412/2311-1623-2024-43-33-40

## Introduction

The phrase “cardiovascular disease” (CVD) refers to disorders affecting the heart and blood vessels, such as deep vein thrombosis, pulmonary embolism, peripheral arterial disease, rheumatic heart disease,

congenital heart disease, coronary heart disease, and cerebrovascular disease<sup>1</sup>. CVD and its risk factors are

<sup>1</sup> World Health Organization Africa Region. Noncommunicable Diseases Key facts: Cardiovascular Diseases.

extremely common in Africa. However, there is a lack of understanding and awareness of the condition and a negative perception of the risk factors [1].

Cardiovascular diseases (CVDs) are a major worldwide health issue with differing effects in different parts of the world, including Africa. In sub-Saharan Africa (SSA), cardiovascular diseases (CVDs) are a major health concern. Current data casts doubt on the long-held myth that CVDs are uncommon in this area [2]. However, the true burden of CVD tends to be underestimated, with model forecasts estimating that CVDs are responsible for about 13% of all deaths and 38% of all non-communicable disease (NCD) deaths in SSA [3]. These estimates are primarily based on urban hospital-based clinical area data [3]. In order to effectively manage patients with cardiovascular disease mortality in SSA, it is imperative to address the various problems that come with cardiovascular diagnosis. The current COVID-19 epidemic has brought even more attention to the need for improving Sub-Saharan African cardiovascular healthcare services [4, 5]. Disparities in healthcare infrastructure and financial restrictions are frequently blamed for discrepancies in the burden of cardiovascular disease (CVD) and related risk factors [6]. Multidisciplinary and interdisciplinary approaches are needed to address this issue from policy to practice. Making cardiovascular health a priority is essential to lowering the increasing morbidity and mortality linked to CVD in Africa [5].

Recall that cardiac arrests and strokes can serve as the initial warning indicators of underlying diseases, which is why CVDs are frequently referred to as “silent killers”<sup>2</sup>. Therefore, it’s very important to be aware of the challenges of early diagnosis and to keep spreading knowledge and encouraging preventative actions to enhance cardiovascular health in sub-Saharan Africa.

The author extracted key data and findings from English peer-reviewed articles, reports, and studies focused on diagnosing and preventing cardiovascular disorders in Africa. Search terms like “cardiovascular disease in Africa”, “Challenges of diagnosis of cardiovascular diseases,” “Challenges in preventing cardiovascular disease in Africa”, and “common

risk factors of cardiovascular disease in Africa” were used. The author gathered the material from publications published in PubMed, Google Scholar, Scopus, Health Websites (WHO, CDC, etc), and other health-related research platforms. Research studies or articles that did not fulfil quality standards or were irrelevant to the main topic and issues were excluded.

### **Common risk factors and burden of cardiovascular disease**

Non-communicable diseases (NCDs) such as CVD coexist with infectious diseases and dietary deficiencies in Africa, creating a dual burden of disease [7, 8]. The epidemiology of infectious diseases has given way to NCDs, especially CVD, throughout Africa [7, 8]. Population ageing, urbanization, and lifestyle modifications all have an impact on CVD. The prevalence of CVD has increased with urbanisation because it causes sedentary behaviour, poor dietary habits, and elevated stress levels [9]. Heart disease and stroke are two of the most common causes of death worldwide, with about one in three fatalities globally attributable to CVDs<sup>3</sup>. More than a million deaths in sub-Saharan Africa were linked to cardiovascular disease (CVD) in 2019, making up 13% of all deaths in Africa and 5.4% of all deaths worldwide<sup>4</sup>. There are an estimated 20 million people with high blood pressure in the African Region, which makes them a substantial risk factor for CVDs<sup>5</sup>. High blood pressure among other metabolic risk factors is responsible for cardiovascular-related deaths as presented in figure 1.

About 80% of coronary heart disease and stroke are caused by behavioural risk factors. The main contributors to cardiovascular disease include bad eating habits, hazardous alcohol consumption, physical inactivity, and tobacco use<sup>6</sup>. According to research

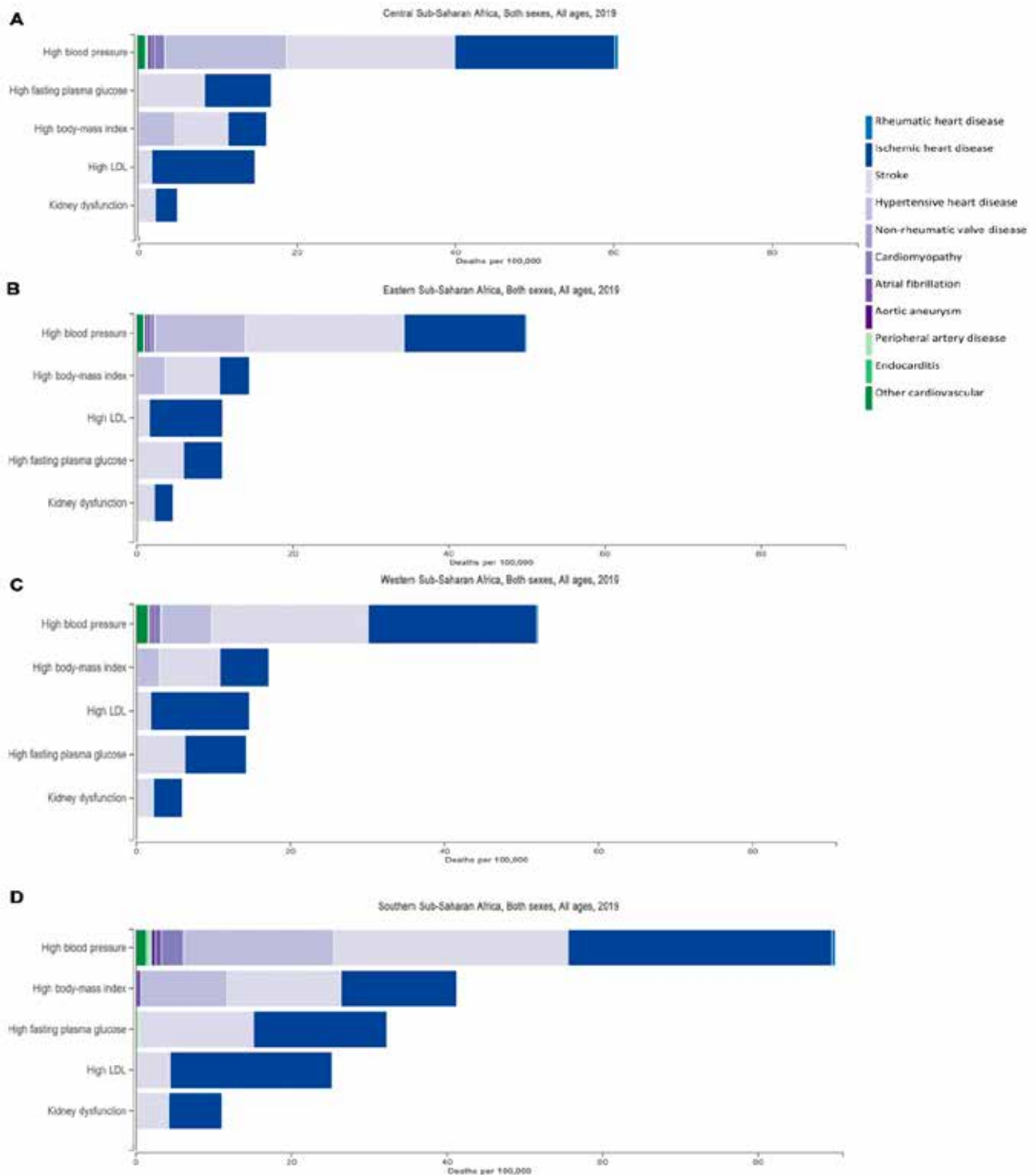
<sup>2</sup> World Health Organization Africa Region. Noncommunicable Diseases Key facts: Cardiovascular Diseases. Available at: <https://www.afro.who.int/health-topics/cardiovascular-diseases> (accessed on 11 February 2024).

<sup>3</sup> World Health Organization Africa Region. Noncommunicable Diseases Key facts: Cardiovascular Diseases. Available at: <https://www.afro.who.int/health-topics/cardiovascular-diseases> (accessed on 11 February 2024).

<sup>4</sup> Africa | Where We Work | World Heart Federation. LIVING WITH CC3 IN AFRICA. Available at: <https://world-heart-federation.org/where-we-work/africa/> [accessed on 21 February 2024] [accessed on 21 February 2024].

<sup>5</sup> WHO Regional Office for Africa. Overview (Cardiovascular diseases). Available at: <https://www.afro.who.int/node/5537> [accessed on 21 February 2024].

<sup>6</sup> WHO Regional Office for Africa. Overview (Cardiovascular diseases). Available at: <https://www.afro.who.int/node/5537> [accessed on 21 February 2024].



**Fig. 1.** Metabolic risk factors and their contribution to the burden of cardiovascular disease in four regions in Sub-Saharan Africa [10]

done in Ethiopia, 70% of individuals engage in several cardiovascular risk behaviours (drinking alcohol, smoking, eating a poor diet, and not exercising), while 70% believe that their chance of developing heart disease in the future is low [11]. Environmental factors (urbanisation, climate change, air, noise, and light pollution, figure 2) and behavioural factors have been

reported to be significant contributors to cardiovascular diseases, with about 25% of all cases of ischemic heart disease (IHD) related to an unhealthy environment, especially air pollution [12], which could be seen in figure 3.

In Africa, most patients suspected of diabetes and hypercholesterolemia face gaps in care, including un-

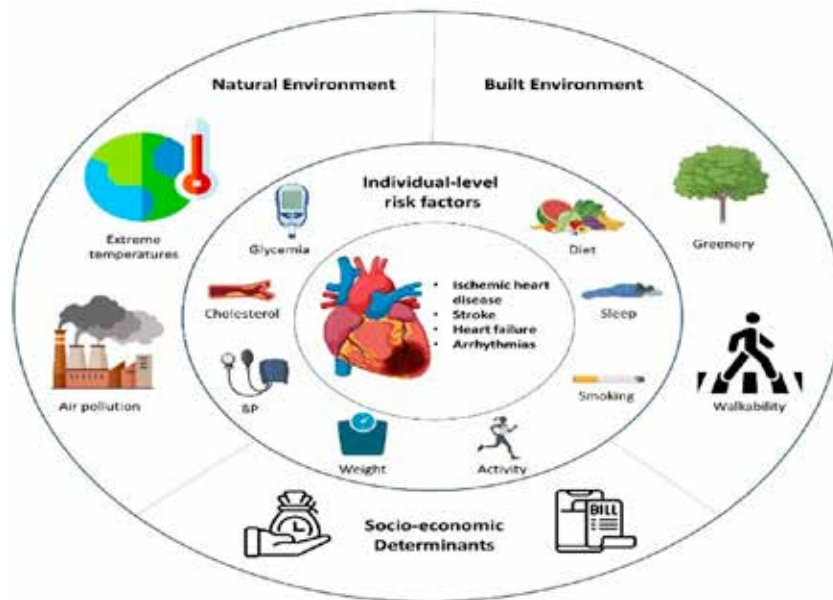


Fig. 2. Individual-level, Natural, and built environmental risk factors, and their contribution to some cardiovascular disease [13]

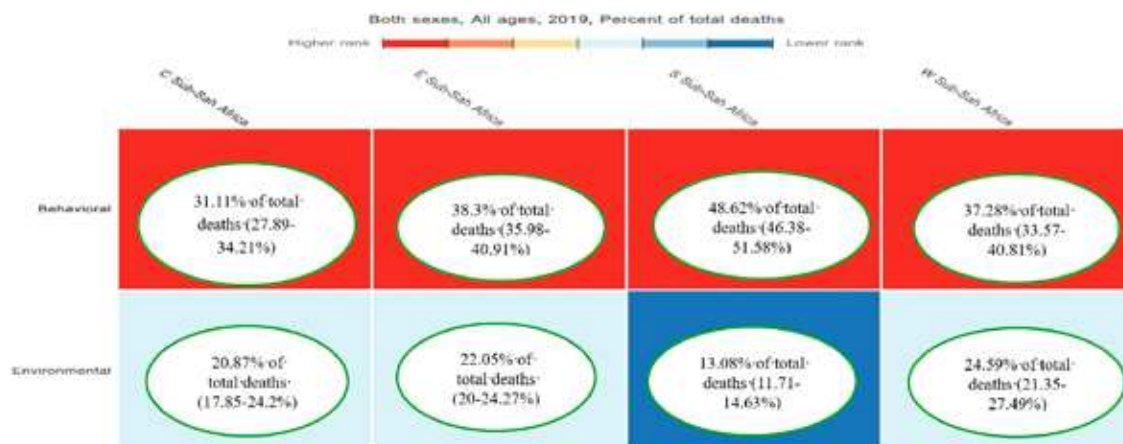


Fig. 3. Behavioral and environmental risk factors and their contribution to the burden of cardiovascular disease in four regions in sub-Saharan Africa<sup>7</sup>

diagnosed, delayed diagnosis and limited access to therapies<sup>8,9</sup>. It is a severe matter because diabetes and high cholesterol are often under-recognized in some countries, such as South Africa, a nation where cardiovascular disease is the second biggest cause of death, accounting for almost 210 fatalities daily. Therefore, early detection, prevention and treatment

are especially critical for people with cardiovascular disease or those who are at high risk due to diseases like hypertension, diabetes, or hyperlipidemia<sup>10</sup>. Limited resources, inadequate healthcare, and difficulties accessing timely diagnosis impact timely lifestyle adoption and treatment seeking, which could contribute to the rising CVD burden as estimated in figure 4<sup>11</sup>.

<sup>7</sup> Institute for Health Metrics and Evaluation [IHME]. GBD Compare Data Visualization. Available online at: <https://vizhub.healthdata.org/gbd-compare/> (Accessed on 10 May 2024).

<sup>8</sup> Diabetes in Africa – 2021. Available at: [https://diabetesatlas.org/idfawp/resource-files/2022/01/IDF-Atlas-Factsheet-2021\\_AFR.pdf](https://diabetesatlas.org/idfawp/resource-files/2022/01/IDF-Atlas-Factsheet-2021_AFR.pdf) (accessed on 21 February 2024).

<sup>9</sup> Analytical fact Sheet: Diabetes is a silent killer in Africa. World Health Organisation African Region. Available at: [https://files.who.int/afahobckpcontainer/production/files/iAHO\\_Diabetes\\_Regional\\_Factsheet.pdf](https://files.who.int/afahobckpcontainer/production/files/iAHO_Diabetes_Regional_Factsheet.pdf) (accessed on 10 March 2024).

<sup>10</sup> WHO Regional Office for Africa. Overview (Cardiovascular diseases). Available at: <https://www.afro.who.int/node/5537> (accessed on 21 February 2024).

<sup>11</sup> Global Alliance for Patient Access: Cholesterol Management in South Africa. Available at: [https://heartfoundation.co.za/wp-content/uploads/2021/03/Policy-Report\\_Cholesterol-Management-in-South-Africa.pdf](https://heartfoundation.co.za/wp-content/uploads/2021/03/Policy-Report_Cholesterol-Management-in-South-Africa.pdf) (accessed on 10 March 2024).

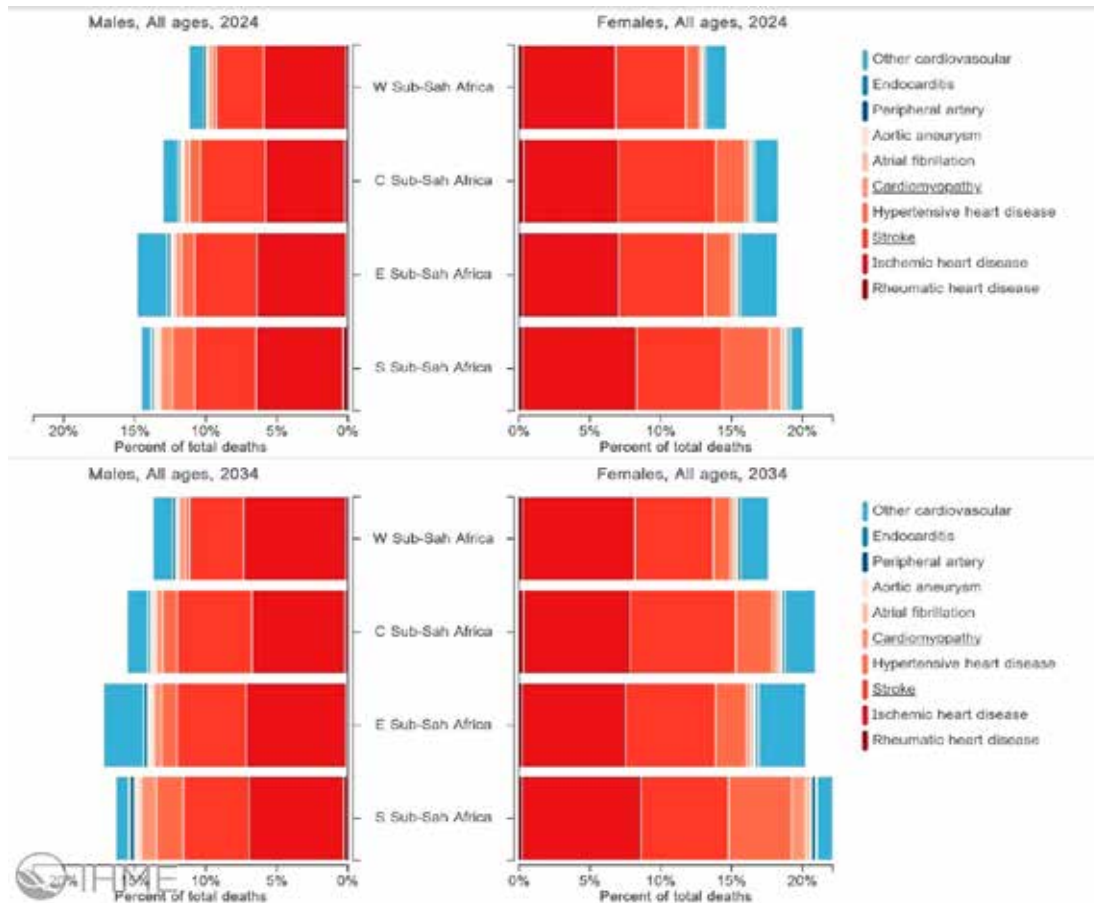


Fig. 4. A ten-year foresight (2024–2034) comparison of Cardiovascular Disease Burden in Sub-Saharan Africa<sup>11</sup>

### Challenges in early diagnosis and prevention of cardiovascular diseases

Reducing salt consumption, increasing fruit and vegetable intake, and managing stress are all effective ways to reduce the risk of cardiovascular disease<sup>12</sup>. Cardiovascular risk factors can be more widely distributed in areas of poverty, low education, and uncontrolled urbanization<sup>13</sup>, which could be due to difficulties in preventing them. Health disparities exist both between and within African countries. These disparities disproportionately affect vulnerable groups, including the poor, women, children, elderly, and displaced populations<sup>14</sup>.

<sup>12</sup> WHO Regional Office for Africa. Overview [Cardiovascular diseases]. Available at: <https://www.afro.who.int/node/5537> (accessed on 21 February 2024).

<sup>13</sup> WHO Regional Office for Africa. Overview [Cardiovascular diseases]. Available at: <https://www.afro.who.int/node/5537> (accessed on 21 February 2024).

<sup>14</sup> Health inequities and their causes. World Health Organization (2018). Available at: <https://www.who.int/news-room/facts-in-pictures/detail/health-inequities-and-their-causes> (accessed on 12 March 2024)

### Resource Constraints

Firstly, in Africa, the prevention of diseases faces significant challenges due to resource constraints. Limited financial, human, and infrastructural resources hinder effective prevention efforts [9]. These constraints impact access to healthcare services, diagnostic tools, and medications. The lack of reliable systems to track CVD patients and a lack of a standardised curriculum for preventative cardiovascular nursing among nurses are some of the major obstacles obstructing Africa's prevention of CVD<sup>15</sup>. Stronger health information systems are necessary for better healthcare delivery. Health information technology mainly aims to remove a number of obstacles that prevent and effectively manage CVD [14]. Due to budgetary limitations and infrastructural issues in Africa, access to non-invasive cardiac imaging modalities (such as cardiac magnetic resonance im-

<sup>15</sup> Remote Patient Monitoring for Cardiovascular Disease. Available at: <https://rpmhealthcare.com/remote-patient-monitoring-for-cardiovascular-disease/>

aging, cardiac computed tomography, and echocardiography) is restricted [15].

### **Social and Economic Factors**

The influence of socioeconomic disparities and status is important in shaping attempts to avoid cardiovascular disease (CVD). Even with universal healthcare access, social poverty is still linked to increased mortality and risk of CVD<sup>16</sup>. Geographical barriers limit access to healthcare services and eventually limit the prevention of CVD<sup>17</sup>. A lack of financial stability, unemployment, and poverty contribute to poor access to healthcare and noncompliance with preventive measures. Inadequate resources present difficulties for management and prevention<sup>18</sup>. Access to treatments, drugs, and healthcare services is impacted by economic reasons<sup>13</sup>. It is critical to address healthcare disparities, particularly in systems of care that are financially burdened; breakthroughs in cardiovascular imaging technology are frequently inadequate<sup>19</sup>. In order to implement successful preventive and treatment plans, it is imperative to address gaps in access to diagnostic imaging and find sustainable solutions. Africa has a heterogeneous socioeconomic landscape that shapes behaviour, risk, and access to healthcare, all of which have an impact on treatment choices and diagnostic precision [28]. Tailored strategies are required to meet specific demands, and it is critical to integrate data from multiple sources (medical history, physical examination, laboratory testing, imaging) and use of modern technology [28].

### **Healthcare System**

The healthcare systems of many African countries are plagued by basic issues, including a deficiency of medical professionals to provide acceptable care, inadequate training, and poor facilities [9]. As is typical in African settings, there is suboptimal teamwork

between doctors and nurses [9,17]. Although frequently absent, health promotion initiatives, including education and awareness campaigns, are crucial for preventing CVD [17]. Patients in Africa frequently experience protracted wait times between presenting symptoms to their doctors and receiving diagnostic tests (echocardiograms or natriuretic peptide tests) [18]. The wait time for referral and diagnosis is even longer for older patients, female patients, and people from lower socioeconomic backgrounds [15]. Therefore, well-organized/structured healthcare systems with collaboration with other stakeholders such as schools and traditional, and religious Leaders can thus enhance prevention efforts.

### **Limited Data and Research**

Significant research on cardiovascular health has been produced in the last few decades [19, 20]. To improve cardiovascular treatment and outcomes, large-scale collaborative studies have significantly advanced the identification of modifiable risk factors and the development of evidence-based guidelines. There is sometimes a dearth of comprehensive data on CVD risk factors, prevalence, and results in Africa [9, 19]. Evidence-based preventative measures are hard to put into practice without solid research. There are still unanswered questions about effective therapies and local risk factors [19, 20]. Because of the poorer data collection systems in Africa, particularly in rural regions, the prevalence of CVD is frequently underestimated. An underfunding of research as well as a lack of highly qualified personnel are further factors in the underestimate [21].

### **Political and Governance Issues**

Foreign policy and global governance frameworks generally have an impact on disease prevention, with policy and resource allocation in healthcare being impacted by political instability, corruption, and governance issues<sup>20</sup>. Effective disease prevention requires strong political leadership with stable governance and prioritization of health initiatives. Governments must commit to comprehensive health policies that address the complex burden of diseases which is essential for successful disease control initiatives.

<sup>16</sup> National Center for Chronic Disease Prevention and Health Promotion, Division for Heart Disease and Stroke Prevention. Available at: [https://www.cdc.gov/dhdsp/health\\_equity/socioeconomic.htm](https://www.cdc.gov/dhdsp/health_equity/socioeconomic.htm) [accessed on 12 March 2024]

<sup>17</sup> Clove David: "Healthcare Access Disparities among Rural Populations in the United States" Ballard Brief. February 2023. Available at: [www.ballardbrief.byu.edu](http://www.ballardbrief.byu.edu) [accessed on 10 April 2024].

<sup>18</sup> Global Alliance for Patient Access: Cholesterol Management in South Africa. Available at: [https://heartfoundation.co.za/wp-content/uploads/2021/03/Policy-Report\\_Cholesterol-Management-in-South-Africa.pdf](https://heartfoundation.co.za/wp-content/uploads/2021/03/Policy-Report_Cholesterol-Management-in-South-Africa.pdf) [accessed on 10 March 2024]

<sup>19</sup> Remote Patient Monitoring for Cardiovascular Disease. Available at: <https://rpmhealthcare.com/remote-patient-monitoring-for-cardiovascular-disease/>

<sup>20</sup> World Health Organization. Health Diplomacy: Global health security is integral to foreign policy. Available at: <https://www.emro.who.int/health-topics/health-diplomacy/foreign-policy.html> [accessed on 12 April 2024].

Certain infections like HIV/AIDS get a lot of political attention, but others like CVD in most African nations go unrecognized [9, 22].

## Conclusion

Early diagnosis and prevention of CVD remains a critical focus, especially for high-risk populations such as Africa, and is crucial for improving patient outcomes. Timely CVD diagnosis is crucial for effective management and improvement of patient outcomes by giving enough time for lifestyle changes that could slow the progression. Some of the challenges include overlapping symptoms with other conditions, making it challenging to pinpoint the exact cause and underdi-

agnosed and delayed diagnosis due to a lack of instruments or expertise. It is also evident that improving healthcare access and encouraging adherence to preventative measures are essential to lowering the burden of CVD. Therefore, factors such as poverty, unemployment, governance, research, and financial instability must be addressed to ensure effective management of CVD in Africa. Addressing these challenges may require collaborative initiatives and a multifaceted community engagement approach, including better education, streamlined diagnostic pathways, and increased awareness of symptoms among patients and healthcare professionals.

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