

## Sudan Country Report

# PASCAR and WHF Cardiovascular Diseases Scorecard project

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### Abstract

On behalf of the World Heart Federation, the Pan-African Society of Cardiology (PASCAR) co-ordinated data collection and reporting for the country-level Cardiovascular Diseases (CVD) Scorecard to be used in Africa. The objective of the scorecard is to create a clear picture of the current state of CVD prevention, control and management per country for 12 African countries. The Sudan Heart Society assisted PASCAR in collating and verifying the data through Drs Awad Mohamed (president, Sudan Heart Society) and Saad Subahi (PASCAR president, based in Sudan). Based on the data collected, we summarise the strengths, threats, weaknesses and priorities identified, which need to be considered in conjunction with the associated sections provided in the infographic published with this report. Data sets used included open-source data from the World Bank, World Health Organisation and government publications.

*Cardiovasc J Afr* 2019; 30: 305–310

[www.cvja.co.za](http://www.cvja.co.za)

DOI: 10.5830/CVJA-2019-063

### Part A: Demographics

According to the World Bank (2018), Sudan is a lower-middle-income country with 66% of its people living in rural areas. In 2009, 14.9% of the population were living below the US\$1.9-a-day ratio. Life expectancy at birth in 2016 was 63 years for men and 66 years for women. The general government health expenditure was 1.97% of the gross domestic product (GDP) in 2015, while the country GDP per capita was US\$2 898.5 in 2017.<sup>1</sup>

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### Part B: National cardiovascular disease epidemic National response to cardiovascular disease (CVD) and non-communicable diseases (NCD)

In comparison to neighbouring countries Ethiopia and Egypt (6 and 16%, respectively), Sudan's premature deaths attributable to CVD (age 30–70 years) centred at 10% in 2010. In 2017, the age-standardised total CVD death rates were high at 33.03%, which was lower than that of Egypt at almost 47% but slightly higher than the 31.8% for the Global Burden of Disease (GBD) data.<sup>2</sup> The percentage of disability-adjusted life years (DALYs) resulting from CVD for men was 12.69% and for women 11.74%, which is lower than the GBD at 14.66% for both genders. Atrial fibrillation (AF) and arterial flutter was 0.14%, while the prevalence of rheumatic heart disease (RHD) was 0.64% compared to that of the GBD data (0.53%). The total RHD mortality rate was 0.38% of all deaths, which is lower than the GBD data (0.51%) (Table 1).<sup>2</sup>

### Tobacco and alcohol

The prevalence of tobacco use in adult men and women (15+ years old) was 27.9 and 0.8%, respectively.<sup>3</sup> Comparative Global Health Observatory (GHO) data are 36.1% for men and 6.8% for women.<sup>4</sup> In the young population (13–15 years old) the prevalence was 9.5% in boys and 4.3% in girls, which is the lowest among those African countries in our sample for which we have data.<sup>4</sup> This prevalence is also lower than the GHO data.<sup>4</sup> For 2018, the estimated annual direct cost of tobacco use was US\$5.91.<sup>3</sup> The premature CVD mortality attributable to tobacco is 1% of the total mortality rate and much lower than that of the global 10%. The three-year (2015–2017) average recorded alcohol consumption per capita (15+ years) was 0.0 litres (Table 1).<sup>4</sup>

### Raised blood pressure and cholesterol

STEPS data released in 2018 indicated 31% of men and 32.1% of women had raised blood pressure levels [systolic blood pressure (SBP)  $\geq$  140 or diastolic blood pressure (DBP)  $\geq$  90 mmHg],<sup>3</sup> which is higher than the respective GHO levels of 24.1 and 20.1%.<sup>4</sup> Conversely, the percentage of individuals with raised total cholesterol levels ( $\geq$  5.0 mmol/l or currently on medication for raised cholesterol) was 13.6% compared to GHO data (38.9%).<sup>3,4</sup> The percentage of DALYs lost because of hypertension was 7.49%, the mortality rate caused by hypertensive heart disease (2.15%) was higher compared to the 1.65% for global data in 2017 (Table 1).<sup>2</sup>

## Physical activity

In 2010, the percentage of 11–17-year-old adolescents who were insufficiently active (less than 60 minutes of moderate- to vigorous-intensity physical activity daily) was 91.9% (global data = 80.7%).<sup>4</sup> The age-standardised estimate for adults who were insufficiently active (less than 150 minutes of moderate-intensity physical activity per week, or less than 75 minutes of vigorous-intensity physical activity per week) was 14.1% (global data = 27.5%) (Table 1).<sup>3</sup>

## Overweight and obesity

In 2018, the prevalence of overweight [body mass index (BMI)  $\geq 25$ – $< 30$  kg/m<sup>2</sup>] and obesity (BMI  $\geq 30$  kg/m<sup>2</sup>) in adults 25 years and older was 28.2 and 10.3%, respectively.<sup>3</sup> Compared to global data, both these indicators are somewhat lower than that of 38.9% for overweight and 13.1% for obesity (Table 1).

## Diabetes

The percentage of the population defined with fasting glucose levels  $\geq 7.0$  mmol/l or on medication for raised blood glucose (age standardised) in 2018 was 5.1% for men and 7% for women.<sup>3</sup> In 2017, the prevalence of age-adjusted (18–99 years) diabetes was 15.7%, which is much higher than that of Africa or the world (Table 1).<sup>5</sup>

## Part C: Clinical practice and guidelines

### Health system capacity

The country had an average of 3.14 physicians and 11.57 nurses per 10 000 of the population in 2008 and 2014, respectively. For every 10 000 people, there were eight hospital beds in 2013.<sup>4</sup>

Locally relevant clinical tools to assess CVD risk have been adopted since 2015.<sup>6</sup> Sudan was one of the lower-middle-income countries to participate in the REMEDY study that reported a hospital-based registry for RHD.<sup>7</sup>

Locally relevant (national or sub-national) clinical guidelines for the management of acute rheumatic fever (ARF) and RHD are also available.<sup>8</sup> No national guidelines for the treatment of tobacco dependence or for the detection and management of AF and pharyngitis have been set up. In 2011, the Federal Ministry of Health (FMOH) NCD directorate, in collaboration with the World Health Organisation (WHO), developed the Sudan diabetes mellitus guidelines.<sup>9</sup>

### Essential medicines and interventions

ACE inhibitors, aspirin,  $\beta$ -blockers, statins, insulin, warfarin and clopidogrel are included in the list of essential medicines in primary-care facilities in the public health sector. However, metformin is not included.<sup>4</sup>

Table 1. Cardiovascular disease indicators for Sudan

Indicators	Male	Female	Total	Year
<b>Status of national CVD epidemic</b>				
Premature CVD mortality (age 30–70 years) (% of deaths)	–	–	10	2012
Total CVD mortality (% of deaths)	32.9	33.1	33 (31.8)*	2017
Total RHD mortality (% of deaths)	0.3	0.5	0.4 (0.5)*	2017
Percentage of DALYs attributable to CVD (%)	12.7	11.7	12.3 (14.7)*	2017
Percentage of AF and arterial flutter (%)	0.2	0.1	0.1 (0.5)*	2017
Prevalence of RHD (%)	0.6	0.7	0.6 (0.5)*	2017
<b>Tobacco and alcohol</b>				
Prevalence of adult tobacco use (15+ years old) (%)	27.9 (36.1)*	0.8 (6.8)*	–	2018
Prevalence of youth (13–15-year-olds) tobacco use (%)	9.5	4.3	–	2009
Estimated direct (e.g. healthcare related) cost of tobacco use in your population (in current US\$)	–	–	5.91	2018
Proportion of premature CVD mortality attributable to tobacco (%)	–	–	1 (10)*	2012
Recorded alcohol consumption per capita (15+ years) (in litres of pure alcohol) (three-year average)	–	–	0	2015–17
<b>Raised blood pressure and cholesterol</b>				
Percentage of population with raised blood pressure (SBP $\geq 140$ or DBP $\geq 90$ mmHg) (%)	31 (24.1)*	32.1 (20.1)*	–	2018
Percentage of population with raised total cholesterol ( $\geq 5.0$ mmol/l) (%)	8.8	19.5	13.6 (38.9)*	2018
Percentage of DALYs attributable to hypertension (%)	7.6	7.4	7.5 (8.7)*	2017
Mortality caused by hypertensive heart disease (% of deaths)	1.7	2.8	2.2 (1.7)*	2017
<b>Physical activity</b>				
Percentage of adolescents (ages 11–17) who are insufficiently active ( $< 60$ min of moderate- to vigorous-intensity physical activity daily) (%)	91.2	92.3	91.9 (80.7)*	2010
Percentage of adults (age-standardised estimate) who are insufficiently active ( $< 150$ minutes of moderate-intensity physical activity per week, or $< 75$ minutes of vigorous-intensity physical activity per week) (%)	11.4	17.3	14.1 (27.5)*	2018
<b>Overweight and obesity</b>				
Percentage of adults who are overweight (BMI $\geq 25$ – $< 30$ kg/m <sup>2</sup> ) (%)	22.6	35.6	28.2 (38.9)*	2018
Prevalence of obesity (BMI $\geq 30$ kg/m <sup>2</sup> ) (%)	6.7	14.9	10.3 (13.1)*	2018
<b>Diabetes</b>				
Percentage of defined population with fasting glucose $\geq 126$ mg/dl (7.0 mmol/l) or on medication for raised blood glucose (age standardised) (%)	5.1 (9)*	7 (8)*	–	2018
Prevalence of diabetes (ages 20–79) (%)	–	–	15.7 (8.6)**	2017

\*WHO Global data.<sup>4</sup>

\*\*IDF Diabetes Atlas.<sup>5</sup>



## Cardiovascular Disease Scorecards – Africa

SUDAN – DECEMBER 2018

### Status of Cardiovascular Disease (CVD) and Non-communicable diseases (NCD)

#### Country Demographics

**World Bank Classification**  
Lower-middle income

**66%**  
of population living in rural areas  
60% (Sub-Sahara Africa)



SUDAN

<p><b>0.38%</b> of total mortality caused by RHD Global data: 0.51%</p>	<p><b>0.64%</b> Prevalence of rheumatic heart disease (RHD) Global data: 0.53%</p>
<p><b>1%</b> of premature CVD mortality attributable to tobacco Global data: 10%</p>	<p><b>27.9% MALE</b> <b>0.8% FEMALE</b> Prevalence of tobacco use age ≥15 Global data: 36.1% (male) 6.8% (female)</p>
<p><b>2.15%</b> of deaths caused by hypertensive heart disease Global data: 1.65%</p>	<p><b>30.6% MALE</b> <b>29.6% FEMALE</b> of population with raised blood pressure (SBP ≥140 or DBP ≥90) Global data: 24.1% (male) 20.1% (female)</p>
<p><b>10.3%</b> Prevalence of obese adults (BMI of ≥30 kg/m<sup>2</sup>) Global data: 13.1%</p>	<p><b>33.03%</b> of deaths caused by CVD Global data: 31.8%</p>
<p><b>15.7%</b> Prevalence of diabetes (ages 20-79) 3.3% (Africa)</p>	<p><b>13.6%</b> of population with raised total cholesterol (≥5.0 mmol/L) Global data: 38.9%</p>

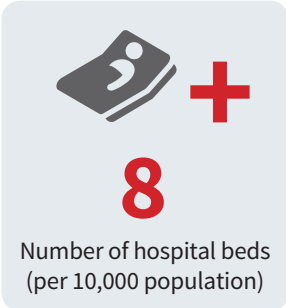
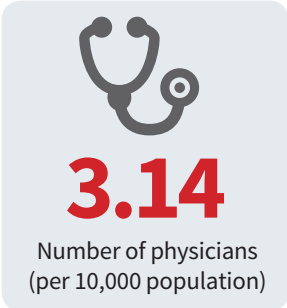


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**SUDAN**

**Health System Capacity**



**KEY:** No data Not in place In process/ partially implemented In place

**Clinical Practice and Guidelines**

Locally-relevant (national or subnational level):

Clinical tool to assess CVD risk .....

Guidelines for treatment of tobacco dependence .....

**Clinical Guidelines for:**

The detection and management of atrial fibrillation .....

The detection and management of acute rheumatic fever .....

The detection and management of rheumatic heart disease .....

The detection and management of diabetes .....

CVD prevention (within the last 5 years) .....

A system to measure the quality of care provided to people who have suffered acute cardiac events .....

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**Cardiovascular Disease Governance**

**A national strategy or plan that addresses:**

CVDs and their specific risk factors .....

NCDs and their risk factors .....

Rheumatic heart disease prevention and control as a priority .....

A national surveillance system that includes CVDs and their risk factors .....

**Stakeholder action**

Non-governmental organizations' advocacy for CVD policies and programmes .....

Civil society involved in developing and implementing of national CVD prevention and control plan .....

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Source References: Global Health Data Exchange; WHO Global Health Observatory data repository; WHO NCD Document repository; Country specific publications.

No data were available for CVD risk stratification in primary healthcare facilities, total cholesterol measurement at the primary healthcare level, and secondary prevention of ARF and RHD in public-sector health facilities.<sup>4</sup>

### Secondary prevention and management

The percentage of hypertensive persons receiving medical treatment is 31.5%.<sup>3</sup> However, no data are available on high-risk patients with AF who are being treated with oral anticoagulants. The percentage of people with a history of CVD taking aspirin, statins and at least one antihypertensive agent is also unknown.

### Part D: Cardiovascular disease governance

A national strategy or plan that addresses CVD, and specifically their risk factors, was developed by the national NCD directorate and is functional.<sup>6</sup> However, no dedicated budget or unit is in place to ensure its implementation. The FMOH also developed a plan that addresses NCD and their risk factors and RHD prevention and control as a priority, which is in use.<sup>8</sup> Sudan has formulated a national tobacco control plan and multisectoral co-ordination mechanism for tobacco control.<sup>10</sup> A national surveillance system including CVD and their risk factors is in the process of being implemented.<sup>3,10</sup>

There are no collaborative projects between the Ministry of Health and non-health ministries for CVD interventions, and the percentage of total annual government expenditure on cardiovascular healthcare is not known. The benefits of CVD prevention and control for health and the economy of this population have not been modelled.

### Assessment of policy response

Legislation that mandates health financing for CVD/NCD has been developed and implemented, along with that of essential CVD medicines at affordable prices.<sup>11</sup> However, no judicial orders protecting patients' rights and mandating improved CVD interventions, facilities, health-system procedures or resources have been implemented.

Regarding tobacco control, legislation on the following has been implemented:

- banning of smoking in indoor workplaces, public transport, indoor public places and other public places
- clear and visible warnings on at least half of the principal display areas of tobacco packs
- banning all forms of tobacco advertising, promotion and sponsorship
- measures to protect tobacco control policies from tobacco industry interference.<sup>10</sup>

The percentage of the excise tax of the final consumer price of tobacco products in Sudan is 230% and that of the final consumer price of alcohol products is unknown.<sup>12</sup>

The country does not have policies that ensure equitable nationwide access to healthcare professionals and facilities or screening of high-risk CVD individuals. No sustainable funding is available for CVD from taxation of tobacco and or other 'sin' products.

As far as food legislation and that of physical activity is concerned, no policy exists for the following:

- taxes on unhealthy foods or sugar-sweetened beverages
- banning the marketing of unhealthy foods to minors
- mandating clear and visible warnings on foods that are high in calories/sugar/saturated fats
- interventions that promote a diet that reduces CVD risk
- interventions that facilitate physical activity.

Alcohol is banned in Sudan therefore no other legislation or policies need to be in effect.

### Stakeholder action

Non-governmental organisation (NGO) advocacy has been demonstrated for CVD policies and programmes, while the Epidemiological Laboratory (EpiLab), a private, not-for-profit NGO in Khartoum, was involved in the development and implementation of a national tobacco-control plan.<sup>13</sup> Unfortunately, there is no known active involvement of patients' organisations in the advocacy for CVD/NCD prevention and management.

Advocacy champions and/or patient engagement for RHD groups are also not available. Involvement of civil society in the development and implementation of a national CVD prevention and control plan and the national multisectoral co-ordination mechanism for NCD/CVD is also lacking. Specific activities by cardiology professional associations aimed at a 25% reduction in premature CVD mortality by 2025 and hypertension screening by businesses at workplaces have not yet been addressed.

As part of the data collected for Sudan, the following strengths, threats, weaknesses and priorities are summarised.

### Strengths

The NCD National Strategic Plan (NSP) 2010–2015 for Sudan was developed by the national NCD directorate at the FMOH in response to the NSP for the health sector (2003–2027), which is an indication of a sound governmental commitment towards NCD.<sup>6</sup>

Guidelines for the management of ARF and RHD are available. A national surveillance system including CVD and their risk factors is in the process of being implemented.

Sudan, through EpiLab, became a pioneer in developing countries through its ground-breaking research demonstrating the feasibility and sustainability of the development and implementation of a national tobacco-control plan.<sup>13</sup> Legislation regarding tobacco control is in place, as is an excise tax. Legislation that mandates essential CVD medicines at affordable prices has been implemented.<sup>11</sup>

### Threats

The percentage of deaths caused by CVD is very high (33%), with Tunisia (51.5%) and Egypt (46.6%) having higher levels compared to the other selected countries and global data (31.8%). DALYs attributable to CVD ranked slightly lower than that of the global data (Table 1). Deaths caused by hypertensive heart disease are also higher compared to the global data, as is raised blood pressure for men and women.

Overweight and obesity tend to be a problem in most African countries, although Sudan has a lower prevalence (28 and 10%, respectively) compared to global data (38.9 and 13.1%,

respectively). In Sudan, the prevalence of diabetes (15.7%) is the highest after Egypt (17.3%) for those countries under investigation and the rest of the world (8.6%) (Table 1).

### Weaknesses

National guidelines to treat tobacco dependence are lacking, as are locally relevant (national or sub-national) clinical guidelines to detect and manage AF. A system to measure the quality of care provided to people who have suffered acute cardiac events is also not available. Although guidelines for diabetes have been developed, its prevalence remains high.

Sustainable funding for CVD along with taxes on unhealthy foods or sugar-sweetened beverages are lacking. Policies and legislation banning the marketing of unhealthy foods to minors and mandating clear and visible warnings on foods are non-existent. There are no policies promoting diets and physical activity to reduce CVD risk.

### Priorities

Comprehensive interventions or programmes are needed to address nutrition, physical inactivity and obesity among adults and children, as has been done for tobacco control. Given the high rates of obesity, overweight and diabetes, front-of-package labelling and higher taxes are needed for unhealthy foods, including sugar-sweetened beverages.

A percentage of the total annual government expenditure should be set apart for cardiovascular healthcare, and the benefits of CVD prevention and control for population health and the economy need to be modelled.

This publication was reviewed by the PASCAR governing council and approved by the president of the Sudan Heart Society.

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