Chapter

Lifestyle and Cardiovascular Risk Factors: Urban Population versus Rural Population in Sub-Saharan Africa

Emmanuel Limbole Bakilo, Dadi-Serge Nkarnkwin, Lucette Womba, Venance Atheno, Mireille Kika, Jean Booto, Reagan Wiyaka, Martine Ekeba and Gilot Ngoma

Abstract

Cardiovascular diseases (CVD) are a major public health problem in Sub-Saharan Africa (SSA), as in the rest of the world, with increasingly increasing morbidity and mortality. We are presenting here, not the results of an epidemiological study, but rather a reflection on the problem of CVD and their risk factors (RFs) in SSA, taking into account the differences in lifestyle between rural and urban areas, the objective being to highlight the differences in the epidemiological profile trends relating to CVDs and their RFs between these two environments on the basis of existing data, to indicate some characteristic features of lifestyle in these two environments and to draw lessons from this in terms of the prospects for combating this new epidemic in this part of the world. We have indicated in this presentation that the prevalence of CVDs as well as that of their RFs show increasing trends in SSA due to new lifestyles linked in particular to urbanization and its numerous economic and social corollaries. However, data on their geographical and sociological distribution, especially in rural and urban areas, are still incomplete. The first existing epidemiological surveys seem to indicate that they are more firmly established in urban areas than in rural areas, probably linked to the difference in lifestyles between these two areas. We concluded by mentioning that it is necessary for SSA states to take the option of launching vast epidemiological and clinical research programs tending to make basic epidemiological data available, taking into account the specific geographic and sociological characteristics of African society. This knowledge, documented in the form of scientific evidence, would make it possible to consider with relevance and effectiveness measures to combat this new epidemic in developing countries.

Keywords: lifestyle, cardiovascular risk factors, rural area, urban area, Sub-Saharan Africa

1. Introduction

Cardiovascular diseases (CVDs), one of the main components of noncommunicable diseases (NCDs), are the first leading cause of mortality worldwide: more people die annually from CVDs than from any other cause.

In 2012, an estimated 17.5 million people died from these diseases, representing 30% of all deaths worldwide. An estimated 7.5 million of these deaths are due to coronary heart disease and 6.7 million to stroke. Low- and middle-income countries are disproportionately affected, accounting for over 80% of CVD deaths. By 2030, nearly 23.6 million people will die from cardiovascular diseases, primarily heart disease and stroke. According to projections, these conditions will remain the leading cause of death in the world [1].

During the 3rd high-level meeting on NCDs, it was reported that seven in 10 people (71%) worldwide die from these diseases, which mainly consist of cardiovascular disease, cancer, diabetes and lung chronic diseases, an average of 41 million people each year. These include 15 million people dying from NCDs between the ages of 30 and 69; over 85% of these "premature" deaths occur in low- and middle-income countries [2].

CVDs, as other NCDs, are favored by factors that are related to genetics, physiology and sociological environment, and are called risk factors (RFs) or specifically cardiovascular risk factors (CVRFs).

The main RF of CVDs or NCDs, are related to the sociological environment, particularly with our lifestyle or our everyday behavior and are thus called behavioral RFs; they are thus deeply influenced by the culture and customs of the environment. It is this link between the sociological environment and the RFs of CVDs or NCDs, which could determine the African disparities between the rural environment, guardian of traditional culture and the urban environment, strongly influenced by Western culture.

1.1 Objective of the presentation

In this chapter, we want to present an overview on CVDs and their RFs in rural and urban areas in Sub-Saharan Africa (SSA), to indicate some characteristic features of lifestyle in these two environments and to draw conclusions from them in terms of prospects for combating this new epidemic in this part of the world.

1.2 Methodology

We conducted a literature review related to the topic of the chapter, based on the available documentation as well as on the international scientific literature accessible through the PUBMED search engine where, after entering the keywords, the most relevant publications were selected. The use of this documentation was carried out taking into account the general situation in the world, the specific situation of the ASS with comparative observation between rural and urban areas.

2. Overview of cardiovascular diseases and risk factors in Sub-Saharan Africa

2.1 Overview

CVDs are a group of disorders of the heart and blood vessels; they include mainly [3]:

- coronary heart disease – disease of the blood vessels supplying the heart muscle;
- cerebrovascular disease – disease of the blood vessels supplying the brain;

- peripheral arterial disease – disease of blood vessels supplying the arms and legs;

- rheumatic heart disease – damage to the heart muscle and heart valves from rheumatic fever, caused by streptococcal bacteria;

- congenital heart disease – malformations of heart structure existing at birth;

- deep vein thrombosis and pulmonary embolism – blood clots in the leg veins, which can dislodge and move to the heart and lungs.

CVDs are promoted by a number of factors called "risk factors" (RFs).The main CVRFs are: poor diet, lack of physical activity, smoking, and harmful use of alcohol. These RFs, related to lifestyle, are called behavioral RFs. They can be the cause of physiological disturbances such as high blood pressure, hyperglycemia, hyperlipidemia and obesity; they are called intermediate risk factors.

CVRFs are also classified into non-modifiable factors and modifiable factors. The unchangeable risk factors are age, sex, race, and inheritance. Modifiable factors correspond to behavioral and biological factors. The **Figure 1** shows the link between CVRFs and CVDs.

STEPS studies carried out on a continental African scale in the 1980s indicated high prevalence of CVRFs and especially hypertension.

The summary of the results of these studies is presented in **Table 1**.

Cardiovascular diseases are become a major public health problem throughout the African Region. The main CVDs are: high blood pressure, stroke,

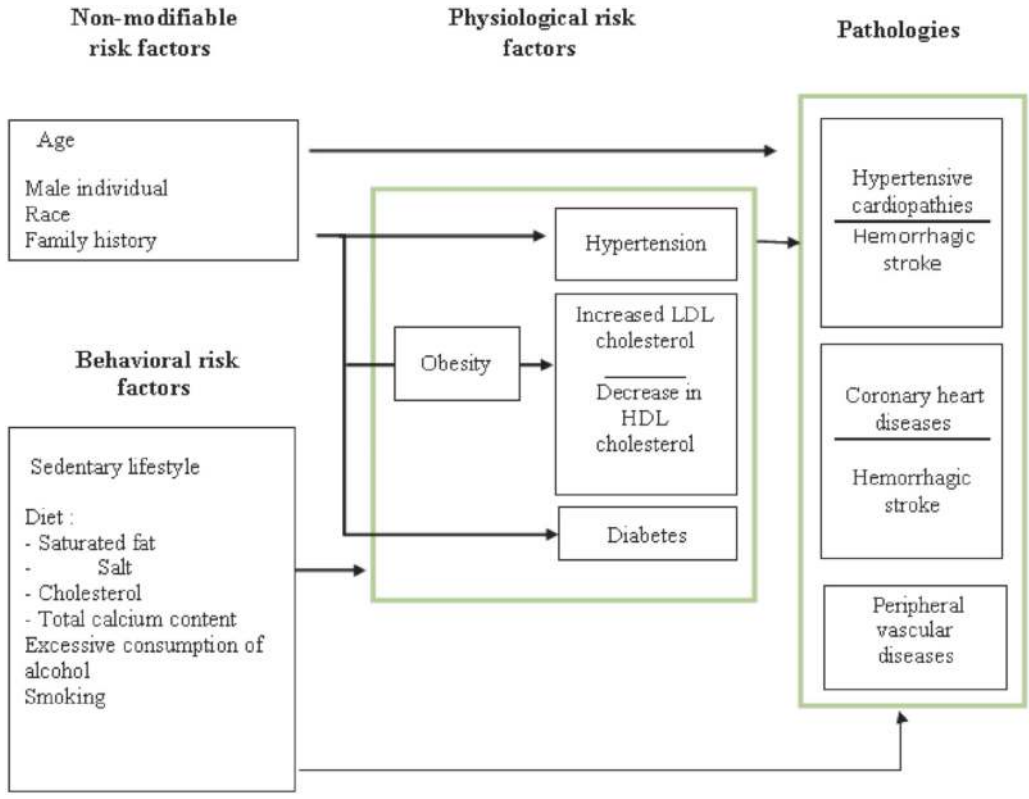

Figure 1.
Relationship between CVRFs and CVDs. Source: Wong ND., Black et Grdin JM., Preventive cardiology: a practical approach, Chicago, Mc Graw Hill, 2005.

Country	Year[1]	%Who Currently Smoke Tobacco	% Who Ate < 5 Servings of F&V Per Day[2]	% Not Engaged in Vigorous Physical Activity	% Who Are Obese[3]	% With Raised Blood Pressure[4]	% With Raised Blood Glucose[5]	% With Raised Total Blood Cholesterol[6]	% With None of the CRFs[7]	% With > 3 of the CRFs, Ages 25–44 Years Old	% With > 3 of the CRFs, Ages 45–64 Years Old	% With > 3 of the CRFs, Ages 24–64 Years Old
Benin	2008	8.8	78.5	58.2	9.4	28.7	3.0	7.9	11.0	9.5	21.8	14.9
Botswana	2007	19.7	96.6	72.7	15.6	33.1	—	—	1.2	25.7	50.4	34.5
Cameroon	2003	6.3	—	84.3	15.9	17.3	13.9	—	—	—	—	—
Cape Verde	2007	9.9	86.1	68.7	10.5	38.7	12.7	13.0	5.0	19.6	41.8	24.8
CAR	2010	14.1	66.1	55.6	7.2	34.5	21.0	—	12.2	12.3	29.4	17.7
Chad	2008	11.2	84.8	74.0	13.7	27.6	—	—	0.3	22.8	37.3	27.8
Comoros	2011	12.9	85.7	61.7	13.5	25.4	4.8	25.9	5.9	18.5	32.3	23.0
Congo, Dem. Rep.	2005	6.4	87.9	96.1	5.8	17.1	—	—	5.3	19.9	34.0	24.1
Congo, Brazzaville	2004	11.1	—	—	8.6	33.3	20.8	—	—	—	—	—
Cote d'Ivoire	2005	14.4	83.5	93.0	8.5	25.9	—	—	4.9	24.5	44.3	30.1
Eritrea	2004	7.8	98.1	83.9	3.4	16.6	—	—	0.8	13.5	26.1	19.4
Ethiopia	2006	4.6	98.9	—	7.1	30.9	—	—	0.3	17.2	34.2	—
Gabon	2009	12.1	93.4	65.0	15.9	20.3	—	—	1.2	30.0	50.0	36.4
Gambia, The	2010	15.6	93.0	58.7	12.1	26.3	—	—	2.1	20.7	39.8	25.8
Guinea	2009	12.8	79.3	52.3	5.1	28.1	5.2	9.8	7.9	15.4	35.2	21.6
Lesotho	2012	24.5	92.7	44.2	19.9	31.0	6.3	4.6	2.2	22.1	41.6	26.7
Liberia	2011	9.9	96.1	59.9	22.0	30.7	19.2	—	1.1	28.7	43.2	33.5
Madagascar	2005	19.6	62.0	75.1	2.2	35.8	—	—	12.8	12.1	17.7	13.8
Malawi	2009	14.1	97.5	17.8	4.6	32.9	5.6	8.7	1.0	13.0	23.7	16.5
Mauritania	2006	18.9	94.8	95.7	20.9	22.4	6.2	24.4	—	—	—	—

Country	Year[1]	%Who Currently Smoke Tobacco	% Who Ate < 5 Servings of F&V Per Day[2]	% Not Engaged in Vigorous Physical Activity	% Who Are Obese[3]	% With Raised Blood Pressure[4]	% With Raised Blood Glucose[5]	% With Raised Total Blood Cholesterol[6]	% With None of the CRFs[7]	% With > 3 of the CRFs, Ages 25–44 Years Old	% With > 3 of the CRFs, Ages 45–64 Years Old	% With > 3 of the CRFs, Ages 24–64 Years Old
Mozambique	2005	18.7	95.0	31.1	7.5	34.9	3.8	2.1	2.4	14.0	28.6	19.0
Niger	2007	4.6	96.4	56.4	3.2	36.3	22.5	—	0.9	17.5	26.8	21.4
Sao Tome and Principe	2008	5.5	83.3	51.6	35.0	38.6	6.5	7.5	6.4	15.6	36.1	22.1
Seychelles	2004	22.2	78.8	73.5	25.1	39.6	9.5	59.7	4.2	29.9	52.1	38.8
Sierra Leone	2009	25.8	90.9	31.0	7.8	34.8	—	—	1.4	22.7	37.2	27.0
Swaziland	2007	7.1	87.4	49.3	24.3	36.0	14.5	5.8	1.9	30.4	47.8	35.5
Tanzania	2012	14.1	97.2	32.4	8.7	26.0	9.1	26.0	0.8	12.2	28.0	16.6
Togo	2010	6.8	94.9	45.7	6.2	19.0	2.6	14.2	2.4	13.1	23.7	16.1
Zambia	2008	6.5	97.0	76.0	14.4	33.3	4.6	23.8	1.0	16.6	46.8	23.7
Zanzibar	2011	7.3	97.9	52.1	14.3	33.0	3.8	24.5	0.6	18.9	38.1	24.2

Source of Data: The World Health Organization. STEPS Country Reports. http://www.who.int/chp/steps/reports/en/. Last accessed on 21 May 2013.
[1]Year of most recent STEPS survey.

[2]Percentage who ate less than 5 combined servings of fruit and/or vegetables on average pet day

[3]Percentage who are obese (BMI at least 30 kg/m^2).

[4]Percentage with raised BP (SBP at least 140 and/or DBP at least 90 mm Hg or currently on medication for raised BP).

[5]Percentage with raised blood glucose as defined below or currently on medication for raised blood glucose:
• plasma venous value _7.0 mmol/L or _126 mg/dl;
•capillary whole blood value _6.1 mmol/L or _110 mg/dl.
[6]Percentage with raised total blood cholesterol.

[7]CRFs are the combined risk factors including (a) current daily smokers; (b) consumption of less than 5 servings of fruits and/or vegetables on average per day; (c) low level of activity (<600 MET-minutes); (d) overweight (BMI at least 25 kg/m^2); (e) raised BP (SBP at least 140 and/or DBP at least 90 mm Hg or currently on medication for raised BP).
*This table (**Table 1**) shows across the continent a very high rate of insufficient physical activity, a high rate of arterial hypertension with nevertheless disparities between the countries, a relatively low rate of obesity compared to the rates observed in Western countries and a higher rate of a combination of RFs from 45 years.*

Table 1.
Prevalence of behavioral RFs and classical biological CVRFs according to STEPS studies [4].

cardiomyopathy and coronary heart disease. In addition, rheumatic heart disease remains a worrying problem [5].

The **Tables 1** and **2** and **Figures 1** and **2** below relating to cardiovascular morbidity and mortality in SSA clearly illustrate the current place occupied by CVDs in this region of the world.

There are also a number of underlying determinants of CVDs. They stem from major social, economic and cultural developments - globalization, urbanization, aging populations, poverty, stress and hereditary factors [3]. It is these socio-cultural and economic disturbances that could partly determine the differences observed between rural and urban areas in Africa.

2.2 Cardiovascular risk factors: rural versus urban environment

Several African studies have indicated a higher prevalence of FDRCV in urban areas than in rural areas and attributed this disparity to lifestyle change in urban areas. The most documented RFs are hypertension, diabetes, obesity, and high cholesterol.

The prevalence of hypertension is very high in SSA. It varies according to the studies and according to the regions globally between 19 and 43% in the general population and can exceed 70% beyond 65 years; it is higher in urban areas than in rural areas [7–9]. Studies carried out across a few African countries have shown

CVDs	Morbidity		Mortality	
	n	%	n	%
Stroke	**10367**	16,57	**2124**	19,68
Heart failure	**5477**	8,76	**876**	8,12
Ischemic cardiopathy	**501**	0,80	**86**	0,80
Pulmonary embolism	**278**	0,44	**103**	0,95
Deep vein thrombosis	**246**	0,39	—	—
Pericarditis	**81**	0,13	**13**	0,12
Valvular heart diseases	**79**	0,13	**12**	0,11
Bacterial endocarditis	**6**	0,01	**2**	0,02
Acute articular rhumatism	**13**	0,02	**1**	0,01
Other	**2432**	3,89	**597**	5,53
All CVDs.	**19480**	**31,14**	**3814**	35,35
All internal medicine diseases	**62553**	**100,00**	**10790**	100,00

Source: Statistics from the National Cardiovascular Disease Control Program, PNMCV / DR. Congo, 2018.
This table shows that CVDs represent 31.1% of all hospitalizations in the medical sector in Kinshasa hospitals between 2007 and 2016; Stroke is the leading cause of morbidity in hospitalization in the medicine sector with 53% of cardiovascular morbidity and 16.6% of overall morbidity, followed far behind by heart failure and ischemic heart disease. We can also observe the low frequency of heart valve disease (including rheumatic valve disease), probably due to the easier access to antibiotics and other preventive measures, mainly in urban areas.
The table indicates also that CVDs represent in Kinshasa hospitals, between 2007 and 2016, 35.4% of overall mortality in the medicine sector; stroke accounts for 55.7% of cardiovascular mortality and 19.7% of overall mortality, followed by pulmonary embolism and ischemic heart disease.
These results on hospital morbidity and mortality in Kinshasa join those of a hospital survey carried out more than twenty years ago in a hospital establishment in Kinshasa, where stroke represented 31% of cardiovascular morbidity, 6% of morbidity overall, 57% of cardiovascular mortality and 12% of overall mortality [6].

Table 2.
Cardiovascular morbidity and mortality from 2007 to 2016 in eight hospitals in Kinshasa, DR Congo.

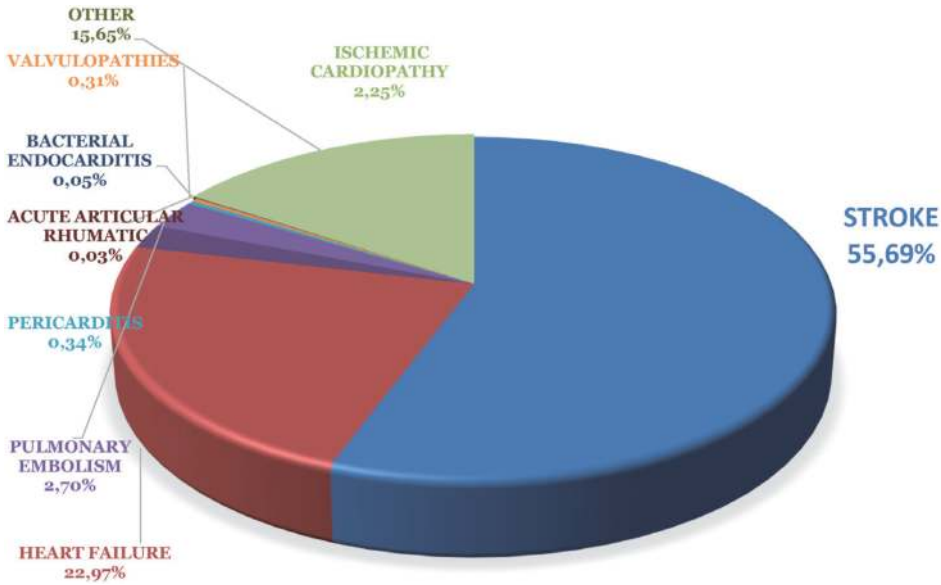

Figure 2.
Proportions of Death from Different CVDs. Source: Statistics from the National Cardiovascular Disease Control Program, PNMCV / DR Congo, 2018. This figure indicates that stroke and all-cause heart failure were the two leading causes of cardiovascular mortality in Kinshasa hospitals between 2007 and 2016, with 55.7% and 23% respectively, followed by pulmonary embolism (2,7%) and ischemic cardiopathy (2,25%).

some prevalence figures: 19.3% and 21.4% respectively in Nigeria and Kenya in rural areas, 23.7% and 38% in Tanzania and Namibia in urban areas [10]. In South Africa, 43% in rural areas, 77.3% in subjects aged over 50 in urban areas [10]. In Benin, the prevalence of high blood pressure, obesity and diabetes has been higher in urban than in rural areas, while, exceptionally, that of smoking has been higher in rural areas [11].

The disparity in hypertension prevalence rates between the different SSA countries is probably linked, beyond the methodology and the conditions for carrying out each study, to the socio-cultural characteristics of each society, including in particular the dietary habits with different salt intake levels.

At the African level, a meta-analysis of SSA carried out in 2007 [12] indicated that diabetes was the second cardiovascular risk factor. Its prevalence is higher in urban areas than in rural areas. This is the case in the Democratic Republic of Congo, where prevalences of 4.8% and 25% were observed in rural and urban areas respectively [13].

The prevalence of obesity is steadily increasing in large cities in SSA, mainly due to the new lifestyle imposed by urbanization. Thereby, the prevalence of obesity is higher in urban than in rural areas and is estimated at over 60% in some regions [10].

In SSA, hypercholesterolemia follows the same geographic distribution as obesity, ie more prevalent in urban areas than in rural areas [7].

In DR Congo, there has been a gradual increase in the prevalence of hypertension over the years, in view of certain surveys carried out mainly in the capital, from 9.9% in 1986 to 26% in 2018 [14–16]; Unfortunately, there is no large-scale survey, in the general population, comparing the burden of CVRFs in rural versus urban areas.

2.3 Lifestyle in rural versus urban areas

According to World Bank data, more than 50% of the population in SSA lives in rural areas, which is characterized by the predominance of traditional economic and social survival activities: agriculture, animal husbandry and fishing. As these

activities have not been modernized, they are essentially carried out by hand and thus require their providers to have a high, regular and permanent level of physical activity. In addition, the diet contains fewer processed products than in urban areas. All this could explain the low prevalence of CVRFs in comparison to the urban environment where we find the following characteristics: tendency to sedentary lifestyle, insufficient physical activity, diet high in sugar, fat and salt, stress psychosocial etc.

Hence the interest of general measures among populations as recommended by the WHO, including reducing salt consumption. In fact, in the 2013–2020 global action plan to combat NCDs [17] adopted in 2013, one of the targets to be achieved by 2025 was the 30% reduction in average salt consumption by populations to reduce the prevalence of hypertension. The effective implementation of this recommendation requires general measures, among the populations, aimed at reducing salt consumption, in particular by discouraging the use of added salt during food preparation or at the table.

It is also useful to mention that locking rural populations in an environment dominated by traditional mores and mentalities can constitute a handicap to understanding and adopting new behaviors necessary for the fight against NCDs. This can make rural populations fragile once they are exposed to NCD RFs. This is precisely what is observed among populations from rural areas and living in peri-urban areas, mentally close to their traditional areas but confronted with a Western-type society that exposes them to the RFs of NCDs. An awareness-raising effort for the fight against NCDs, adapted to each environment and each social category, deserves to be encouraged.

3. Discussion

The difference in lifestyle between rural and urban areas in SSA is a sociological reality known to all; however, the impact on the burden of CVRFs in these two settings has not yet been sufficiently studied. This is mainly due to the high cost of epidemiological surveys in the general population. Nevertheless, the few studies carried out in these two environments and mentioned in this chapter, although small in scope, have been able to provide some information tending to confirm the difference between these two environments.

The rural environment is characterized by its still strong attachment to the customs and mores of traditional African society where individuals are physically active, most often consuming natural foods and less exposed to stress related to the vagaries of modern society. There is therefore a low exposure to CVDFs and hence to CVDs. Conversely, progress in the fight against infections is less noticeable there, which would explain an infectious mortality even more marked than in urban areas, a residue of the era of major pandemics. All of this deserves to be documented by solid epidemiological investigations that can inform health and policy decisions. On the basis of current plot data related to CVDs and CVRFs in rural areas, it could be said that rural areas in SSA are still between the 1st and 2nd stage of the epidemiological transition following the subdivision described by Meslé and Vallin in 2007 [18], while the urban environment could be considered to be already in the middle of the 2nd stage, in view of the real decline of the infectious risk to the benefit of NCDs and their RFs.

As a reminder, the concept of epidemiological transition was launched by Omran in 1971 [19] and subdivided into three stages below by Meslé and Vallin in 2007:

- the stage of high infectious morbidity and mortality, with low life expectancy;

- the stage of decline in pandemics, leading to an improvement in life expectancy;

- the stage of the reign of chronic diseases or NCDs, a consequence of the increase in life expectancy.

This concept was supplemented by that of health transition [20], which is more global, encompassing not only the epidemiological situation but also the different responses from society to health issues.

Conversely, the urban and peri-urban environment in SSA are characterized by a tendency to sedentary lifestyle, a diet rich in sodium and calories, excessive alcohol consumption, socio-professional stress, all this in a context of poverty or social insecurity. Linked in particular to an uncontrolled rural exodus. This results in an increase in biological or physiological RFs [15, 21, 22] and a vicious circle between NCDs which exacerbate poverty and vice versa, poverty which promotes NCDs [23], poverty understood in the classic World Bank sense, namely an income of less than $ 1.9 per day per person or the inability to afford basic minimum services.

There is growing evidence that poverty promotes NCDs, particularly through poor accessibility to treatment [24] and other health services; in low-income countries, the high prevalence of RDF of NCDs, the early onset of their complications [25–29] as well as the excess mortality associated with these diseases constitute strong arguments in favor of this link between poverty and NCDs. The following statement by Ambassador Taonga Mushayavanhu, Permanent Representative of the Republic of Zimbabwe to the United Nations Office at Geneva, within the framework of the "Dialogue on NCDs, Poverty and Development Cooperation" forum is sufficiently enlightening on the question:

"In developed countries, the population often takes advantage of multisectoral policies and plans put in place by the government to reduce exposure to risk factors and empower health systems", explains the Ambassador, who adds: "Developing countries have little capacity to fight NCDs, which leads to premature death, reduces productivity, slows economic growth and locks the most destitute in chronic poverty. In a report published in April 2013, the African Union pointed out that the exorbitant costs associated with NCDs push 100 million people into poverty each year, hampering development. Yet the tools, knowledge and strategies available today can prevent most of these diseases" [23].

It should be recalled that NCDs have already been the subject of three high-level meetings at the United Nations, in 2011, 2014 and 2018, each time bringing together the various member states of the world organization at the highest level of representation. World leaders have recognized that NCDs pose the greatest threat to health and development worldwide, especially in the developing countries. To this end, a political declaration on NCDs was adopted at the first high-level meeting.

At the Sixty-sixth World Health Assembly held in May 2013 and as part of the follow-up to the Political Declaration of the First High-Level Meeting of the United Nations General Assembly on the Prevention and Control of Noncommunicable Diseases, States approved the Global Plan of Action for the Control of Noncommunicable Diseases for 2013–2020 [17], whose objectives and voluntary global targets are as follows.

3.1 Objectives

1. To raise the priority accorded to the prevention and control of noncommunicable diseases in global, regional and national agendas and

internationally agreed development goals, through strengthened international cooperation and advocacy;

2. To strengthen national capacity, leadership, governance, multisectoral action and partnerships to accelerate country response for the prevention and control of noncommunicable diseases;

3. To reduce modifiable risk factors for noncommunicable diseases and underlying social determinants through creation of health-promoting environments;

4. To strengthen and orient health systems to address the prevention and control of noncommunicable diseases and the underlying social determinants through people-centred primary health care and universal health coverage;

5. To promote and support national capacity for high-quality research and development for the prevention and control of noncommunicable diseases;

6. To monitor the trends and determinants of noncommunicable diseases and evaluate progressin their prevention and control.

3.2 Voluntary global targets

1. A 25% relative reduction in the overall mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases;

2. At least 10% relative reduction in the harmful use of alcohol, as appropriate, within the national context;

3. A 10% relative reduction in prevalence of insufficient physical activity;

4. A 30% relative reduction in mean population intake of salt/sodium;

5. A 30% relative reduction in prevalence of current tobacco use in persons aged 15+ years;

6. A 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances;

7. Halt the rise in diabetes and obesity;

8. At least 50% of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes;

9. An 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major noncommunicable diseases in both public and private facilities.

Unfortunately, during various evaluations of the progress made in the implementation of the commitments made by the States, the observation was disappointing: most of them had not reached the desired level in the process of implementation of the States commitments [30].

To this end, seven main obstacles to the implementation of these commitments have been identified, namely:

1. lack of political will, mobilization, capacity and action;

2. lack of policies and plans for NCDs;

3. difficulties in setting priorities;

4. impact of economic, business and market factors;

5. insufficient technical and operational capacities;

6. Insufficient funding (internal and international) to transpose scaling up measures to combat NCDs; and.

7. lack of accountability.

This explains, in most states in SSA, a situation of inertia in the implementation of the recommendations and commitments made by the leaders of these states, with multiple consequences: absence of administrative and legal reforms to support the fight against NCDs, lack of support for national programs, where they exist, scarcity of basic epidemiological data on NCDs, lack of support for healthcare establishments for the management of NCDs, etc.

In this context, it is understandable why in SSA states, there are no national registers of NCDs, nor large-scale general population data on NCDRFs or CVRFs, and even less on CVDs; healthcare establishments are not equipped for the correct management of NCDs or CVDs. These states for the most part do not have structures for universal health coverage to promote accessibility for all to quality care. Comparative information on NCDs and their RFs between rural and urban areas is not sufficiently documented, apart from a few small series.

In view of this gloomy picture of CVDs in SSA, one of the priority actions should concern the carrying out of large national surveys of the prevalence of CVRFs so as to make basic epidemiological data available. This would make it possible to identify evidence on the possible differences between the different environments, urban and rural, and to draw the necessary consequences in terms of prospects for the control of CVDs.

4. Conclusion

CVDs are one of the major current public health problems in SSA and globally. They are among the main causes of morbidity and mortality in SSA, but data on their geographical and sociological distribution, especially in rural and urban areas, are still incomplete. The first existing epidemiological surveys seem to indicate that they are more firmly established in urban areas than in rural areas, probably linked to the difference in lifestyles between these two areas. SSA states need to take the option of launching vast epidemiological and clinical research programs aimed at making basic epidemiological data available, taking into account the sociological specificities of African society. This knowledge, documented in the form of scientific evidence, would make it possible to consider with relevance and effectiveness measures to combat this new epidemic in developing countries.

Author details

Emmanuel Limbole Bakilo[1,2,3,4*], Dadi-Serge Nkarnkwin[1,3,4], Lucette Womba[4], Venance Atheno[3,4], Mireille Kika[4], Jean Booto[4], Reagan Wiyaka[3,4], Martine Ekeba[4] and Gilot Ngoma[4]

1 Cardiology Service, Kinshasa University Clinics, Faculty of Medicine, University of Kinshasa, Kinshasa, DR, Congo

2 Internal Medicine Service, Ngaliema Clinic, Kinshasa, DR, Congo

3 Gombe Center of Internal Medicine and Cardiology (CMCG), DR, Congo

4 National Cardiovascular Diseases Control Program, DR, Congo

*Address all correspondence to: drlimbole@gmail.com

IntechOpen

References

[1] About cardiovascular diseases, WHO, 2020.

[2] Third high-level meeting on NCDs, UN, 2018.

[3] Cardiovascular diseases, WHO, 2017.

[4] Mensah, G.A., 2008. Ischaemic heart disease in Africa. Heart, 94(7), p.836–843.

[5] Regional Committee for Africa, 55. (2005). Cardiovascular Diseases in the African Region: Current Situation and Prospects: Report of the Regional Director. WHO. Regional Office for Africa.

[6] Mbala Mukendi M., Tambwe M.J., Lizwa B.B., Dikasa N.L., J.R M'Buyamba Kabangu. Morbidity and mortality in Zairian adults; Panorama med. 1994; 5: 234–237.

[7] Onen CL. Epidemiology of ischaemic heart disease in sub-Saharan Africa. Cardiovasc J Afr. 2013;24(2): 34–42.

[8] Hendriks ME, Wit FWNM, Roos MTL, Brewster LM, Akande TM, de Beer IH, et al. Hypertension in sub-Saharan Africa: cross-sectional surveys in four rural and urban communities. PloS One. 2012;7(3):e32638.

[9] Addo J, Smeeth L, Leon DA. Hypertension in sub-saharan Africa: a systematic review. Hypertension. 2007; 50(6):1012–1018.

[10] Steyn K, Gaziano TA, Bradshaw D, Laubscher R, Fourie J, South African Demographic and Health Coordinating Team. Hypertension in South African adults: results from the Demographic and Health Survey, 1998. J Hypertens.

[11] Houehanou, Y.C.N. et al., 2015. Magnitude of cardiovascular risk factors in rural and urbanareas in Benin: findings from a nationwide steps survey. *PloS One*, 10(5), p.e0126441.

[12] Sagui E. [Stroke in sub-Saharan Africa]. Médecine Trop Rev Corps Santé Colon. 2007;67(6):596–600.

[13] Kasiam LOJB, Longo-Mbenza B, Nge OA, Kangola KN, Mbungu FS, Milongo DG. Classification and dramatic epidemic of diabetes mellitus in Kinshasa Hinterland: the prominent role of type 2 diabetes and lifestyle changes among Africans. Niger J Med J Natl Assoc Resid Dr Niger. 2009;18(3): 311–320.

[14] J R M'Buyamba-Kabangu, R Fagard, P Lijnen, J Staessen, M S Ditu, K A Tshiani, A Amery. Epidemiological study of blood pressure and hypertension in a sample of urban Bantu of Zaïre. J Hypertens. 1986 Aug;4(4):485-91.

[15] Benjamin Longo-Mbenza [1] , Dieudonné Vangu Ngoma, Damien Nahimana, Dominique Mupepe Mayuku, Simon Mbungu Fuele, Florent Ekwanzala, Christian Beya. Screen detection and the WHO stepwise approach to the prevalence and risk factors of arterial hypertension in Kinshasa. Eur J Cardiovasc Prev Rehabil. 2008 Oct;15(5):503–8.

[16] Buila NB, Ngoyi GN, Bayauli PM, Katamba FK, Lubenga YN, Kazadi SM, Kiadi GD, Lepira FB, Kabanda GK, Kika ML, Beaney T, Ster AC, Poulter NR, M'Buyamba-Kabangu JR. Analysis of blood pressure and selected cardiovascular risk factors in the Democratic Republic of the Congo: the May Measurement Month 2018 results. Eur Heart J Suppl. 2020 Aug; 22(Suppl H): H50–H52.

[17] WHO 2013. Global action plan for the prevention and control of NCDs 2013–2020.

[18] Meslé, F. & Vallin, J., 2007. [From epidemiological transition to health transition]. Médecine Tropicale, 67(6), p.545–551.

[19] Omran AR. The epidemiologic transition: a theory of the epidemiology of population change. 1971. Milbank Q. 2005;83(4):731–757.

[20] Frenk J, Bobadilla JL, Stern C *et Coll* - Elements for a theory of the health transition. Health Transition Review 1991 ; 1 : 21–38.

[21] Aspray, T.J. et al., 2000. Rural and urban differences in diabetes prevalence in Tanzania: the role of obesity, physical inactivity and urban living. Transactions of the Royal Society of Tropical Medicine and Hygiene, 94(6), p.637–644.

[22] Poulter, N.R. et al., 1985. Determinants of blood pressure changes due to urbanization: a longitudinal study. *Journal of Hypertension.* Supplement, 3(3), p.S375–S377.

[23] WHO, 2015. Dialogue on NCDs, Poverty and Development Cooperation.

[24] Diane Macquart et al. Factors associated with poor adherence to medication among hypertensive patients in twelve low and middle income Sub-Saharan countries. PLoS One. 2019; 14(7): e0219266.

[25] Limbole EB, Magne J, Lacroix P. Stroke characterization in Sun-saharan Africa: Congolese population. Int J Cardiol. 2017 Aug 1;240:392–397.

[26] Damasceno A, Gomes J, Azevedo A, Carrilho C, Lobo V, Lopes H, et al. An epidemiological study of stroke hospitalizations in Maputo, Mozambique: a high burden of disease in a resource-poor country. Stroke J Cereb Circ. 2010; 41(11):2463–2469.

[27] Longo-Mbenza B, Lelo Tshinkwela M, Mbuilu Pukuta J. Rates and predictors of stroke-associated case fatality in black Central African patients. Cardiovasc J Afr. 2008;19(2): 72–76.

[28] Longo-Mbenza B, Phanzu-Mbete LB, M'Buyamba-Kabangu JR, Tonduangu K, Mvunzu M, Muvova D, et al. Hematocrit and stroke in black Africans under tropical climate and meteorological influence. Ann Med Int. 1999;150(3):171–177.

[29] Damorou F, Yayehd K, Pessinaba S, Tcherou T, Amonu J. Mortality associated with cardiovascular diseases in three hospitals of Lomé-city. Pan Afr Med J. 2011;10:40.

[30] UN, 2018. High Level Meeting on NCDs.