American Research Journal of Humanities Social Science (ARJHSS)
E-ISSN: 2378-702X
Volume-04, Issue-08, pp-24-31
www.arjhss.com

Research Paper Open Access

Socioeconomic Determinants of Hypertension in the Democratic Republic of Congo: A Review of the Literature

Antoine Ependja Towaka[1], Espérant Bolimbo Likwela[1], Projet du ciel Babaya Sengi[1], Alphonse Bebandela Maingolo[1], Zénon Baombolia Lokangu[1] and Kombozi Etondo Bokambi[1]

1. Higher Institute of Medical Technology of Yangambi, Yangambi, DR Congo
Correspondent author : Antoine Ependja Towaka.

Abstract : The Democratic Republic of the Congo is currently characterized by a high incidence of cardiovascular disease, of which hypertension is a major risk factor. However, there are no national studies revealing the current burden of hypertension. This literature review aims to assess the prevalence and determinants of hypertension in the Democratic Republic of the Congo compared with other countries in the world. A systematic search of epidemiological studies on hypertension published between 1999 and May 2019 was performed. The main MeSH terms "hypertension", "prevalence", "socioeconomic determinant" and "DRC" were used in the search. Data on hypertension prevalence, socioeconomic determinants, and author recommendations were extracted and compared. Fifty-two articles were included for data extraction. The prevalence reported in the studies ranged from 14.4% to 28%. A higher prevalence of hypertension was observed in women and in the urban population with a mean age of preference of 40 to 60 years. Determinants significantly associated with hypertension were age, sex, residence, education level, financial income level, social status, household status, intake of alcoholic beverages, sedentary lifestyle, heredity of hypertension, heredity of obesity, obesity, and abdominal obesity. Because of the obesogenic lifestyle, a national survey is needed to determine the prevalence of hypertension in DR Congo.

Keywords: Hypertension, arterial hypertension, prevalence, risk factor, socioeconomic.

I. Introduction

Hypertension remains a public health problem worldwide, in both developed and developing countries, because of its high prevalence and complications.

Data from 30 regional or national studies showed that 26.4% of the adult population in 2000 had hypertension, for a total estimated number of 972 million people, 333 million in developed countries and 639 million in developing countries. By 2025, researchers have estimated that 29.2% of the adult population will be hypertensive, or 1.56 billion people, for an increase of 60% in 25 years [1].

According to the WHO, cardiovascular diseases are responsible for approximately 17 million deaths per year worldwide, which is almost one third of total mortality [2]. Of this figure, Lim et al pointed out that 9.4 million deaths per year are attributable to complications of hypertension [3]. Hypertension is responsible for at least 45% of heart disease deaths and 51% of stroke deaths [4].

In sub-Saharan Africa, the more or less deteriorated environment is part of the health transition. By influencing the intrinsic characteristics of individuals and their behaviors, it explains, in part, the etio pathogenesis of hypertension [5] and perhaps its exponential growth in the population. Thus, the overconsumption of salt [6], fat and alcohol, the standards of beauty in women and social success in men that legitimize or even encourage obesity, the sedentary lifestyle, the low level of physical activity and social isolation maintained by poorly consumed urbanization, the financial precariousness of the populations and the insufficiency of resources, particularly health resources, linked to underdevelopment, are all factors that favor hypertension in adults.

In DR Congo, although the prevalence of hypertension is not clearly known and documented, Philippe Katchunga found it to be 41% in urban areas and 38% in rural areas among the Congolese population in the province of South Kivu in 2011[7], proving that this condition is a real public health problem. M'Buyamba-Kabangu found, more than 20 years ago, a prevalence of hypertension of 30% in rural areas compared to 16.7%

in urban areas [8,9] with old age as a major determinant for rural areas. Over three decades, the prevalence of hypertension has increased in DR Congo. In 1987, M'buyamba et al. found a prevalence of 14.2% in urban areas and 9.9% in rural areas [8] and this had almost doubled by 2005 to 26.7% according to Longo et al.
Hospital data have shown that cardiovascular diseases account for 20.7% of total morbidity and 21% of mortality; hypertension contributes to more than 12.5% of this morbidity and 14.7% of mortality [11].
In fact, since 1990, the DR Congo has been experiencing multiform and unspeakable socio-political and military crises. These socio-economic conditions prevent the adoption of healthy hygienic and dietary behaviors or health promotion.

During these two decades, the rate of urbanization has continued to increase against a background of acculturation and westernization through epidemiological, demographic and nutritional transitions [12, 13, 14]. Many factors related to industrialization and modernization of cities have led to a change in lifestyle: unbalanced diet (high salt and fat habit, but low fruit and vegetable intake), stress, decreased physical activity (sedentary lifestyle) due to more sedentary work activities, use of computers, watching television programs, use of motorized transport, etc.
Ethnic conflicts, wars of aggression, rural-urban migration and increased urban insecurity contribute to the increase in daily stress [15].
The sale of sports fields and public green spaces is a source of enrichment for urban community leaders. The long hours spent watching television and the absence of sports facilities increase the physical inactivity of the Congolese population [16].

Television advertising promotes other risk factors such as alcoholism and cigarette smoking. Excessive alcohol consumption has increased in both urban and rural areas [17].
However, there are very few national studies revealing the current burden of hypertension in DR Congo. Very few studies related to the prevalence, knowledge and level of control of hypertension are documented and available. The few existing studies indicate that the prevalence of this condition varies between 2 and 15% depending on whether one is in a rural or urban area and depending on the ethnic group [18].
In view of the above, we wondered what are the socio-economic determinants of hypertension in DR Congo.
The main objective of this literature review is to evaluate the determinants of hypertension in the Democratic Republic of Congo compared to other countries in the world. Specifically, it was intended to:
- Identify the prevalence of hypertension in DR Congo and in the world;
- Identify the intrinsic, behavioral and socio-economic determinants of hypertension in the epidemiological context of the DR Congo in the 21st century compared to other countries;
- Compare the prevalence and socio-economic determinants of hypertension in DR Congo with other countries in the world;
- To identify recommendations made by the researchers for the general population, health care personnel and hypertensive patients.

II. Methodology

A systematic and advanced search without language restriction using key words on hypertension was performed in the databases (PubMed and Google Scholar) and a standard search using search robots. It concerned the titles of articles, abstracts, reports, dissertations, and any other electronic presentation, without restriction of type of format and year concerning some American, European, Asian, and African countries as well as the DR Congo.

2.1 Search strategy and selection criteria

Prior to a systematic search, we conducted a pilot search of documents based on key words. We used search terms such as "hypertension", "hypertens *", "hypertension", "socio-economic determinant", "democratic republic of Congo".
The logical separators AND and OR were used to combine these words to obtain the search items.
In addition, in the Medline database, the term "hypertension" in MeSH Major also means "hypertension." Therefore, a systematic literature search was performed in the Medline database with the MeSH Major subject terms limited to individuals aged 18 years and older. Databases were also searched for articles published in other jurisdictions, including the Americas, Europe, Asia, Oceania, and Africa.
All articles searched were published from 1999 to May 2019.

2.2 Inclusion criteria

Studies were included if the following criteria were met:
- The study must be based on the general population
- The study had been conducted on a representative population aged at least 18 years
- Hypertension was clearly defined.
- The prevalence of hypertension was reported in men and women.

2.3 Non-inclusion criteria

Studies were excluded under the following conditions:

- They addressed an occupational group, ethnic minority, pregnant women, specific gender, etc.
- The size of the study population was less than 30.
- There was no reporting of the overall prevalence of hypertension in the population or the prevalence of hypertension in men and women.
- The study contained data that could have been published in more than one article.
- The year of study was not reported.

2.4 Study variables

The following information was collected for each study including study reference or setting, author, year of publication, urban and rural prevalence, intrinsic, behavioral and socioeconomic determinants, and recommendations.

2.5 Screening and data extraction

Once the search results were saved, we proceeded with the reading to evaluate the publications searched. The first step was to perform a quick scan of the title and abstract and exclude those that were explicitly irrelevant to the prevalence and determinants of hypertension data. Then, the remaining manuscripts were assessed and analyzed for full-text reading with consideration of the inclusion criteria.

As tools for data extraction, we designed two grids. The first matrix was used to transcribe information on country, year of publication, authors, urban and rural prevalence, intrinsic, behavioral and socioeconomic determinants.

The second grid was used to transcribe some recommendations from the selected publications.

The results were presented according to the relevance of the research, the authors, the types of studies and the inclusion criteria.

2.6 Data Analysis

The trend in the prevalence of hypertension according to the determinants of hypertension by country was presented in the tables. This descriptive analysis allowed us to compare and interpret the results.

III. Results

3.1 Search Results

The initial database search identified 340 potential articles, including 180 from the PubMed and Google Scholar database while 160 articles retrieved from the standard search using search robots. After scanning titles and abstracts, 340 articles were reviewed for full-text review. Articles with data from the same source were compared for consistency. Finally, 52 articles were included for data extraction.

3.2 Characteristics of the included studies

The main characteristics of the selected studies were presented in a table format. The articles were classified by author, year of publication, sample size, prevalence, socioeconomic determinants and behavioral measures.

The studies identified were mainly published journal articles, dissertations and doctoral theses as well as epidemiological surveys. Studies that used a blood pressure value of at least 160/95 mm Hg for hypertension also reported a prevalence of hypertension with a cutoff value of 140/90 mm Hg.

However, it should be noted that for the DR Congo, we did not find any studies conducted in the national territory. The six publications consulted concerned the city of Kinshasa, Kisangani, Mbuji mayi and South Kivu.

3.3 Prevalence of hypertension

The prevalence of hypertension varied from study to study. For the national-level studies, the lowest reported prevalence of hypertension was 16.5% in France, whereas the highest prevalence was 31.1% in Singapore.

However, the 2017 publication by Clément Dumas also reported a high prevalence of 31% in France.

In DR Congo, studies in the cities of Mbuji mayi, Kinshasa, and Kisangani found a prevalence of 14.4%, 26.7%, and 28% respectively.

Apart from the work done by Kaniki and Mupepe, the other four studies showed the prevalence of hypertension in urban and rural areas.

3.4 Age of predilection for hypertension

Fourteen studies reported the prevalence of hypertension in different age groups. For work done at the national level, the mean age of predilection for hypertension ranged from 40 to 64 years. The same trend was also found for studies published in four cities of the DR Congo.

3.5 Hypertension by Gender

Among the studies that reported prevalence of hypertension by sex, the prevalence of hypertension in men and women varied by location and duration, with prevalence ranging from 24.7% to 56% in men and 21.8% to 68.7% in women. The highest prevalence of hypertension was recorded in women with 68.7% in Mali by Maxime Dembélé in 2010. Among men, Fang & al found 56% in China in 2014.

In DR Congo, this prevalence ranges from 16.8% to 29% in men and 11.2% to 76% in women.

3.6 Marital status

At the national level, the few publications consulted reported a prevalence of 32.9% in Singapore and 78.9% in Mali among married people. In contrast, Jocelyn Inano in 2008 in the Antilles-Guyana observed among married men 23.4% and 19.7% among women and a higher prevalence of 45.8% among widows.

In DR Congo, only the work done by Lulebo & al in 2013 in Kinshasa found 46.5% of hypertensives among the married. The other studies were silent on this subject.

3.7 Educational level

Studies conducted at the national level found a prevalence of 32% to 67.9% among subjects with primary education and 14.3% to 59.2% among those with no schooling or individuals without a baccalaureate. However, in DR Congo, two studies out of six reported this determinant. Lulebo et al. in Kinshasa and Atoba et al. in Kisangani found 40.5% and 61.5% respectively among individuals with secondary education and those without schooling.

3.8 Religion

Apart from Lulebo et al in Kinshasa who recorded 48.9% of hypertensive individuals among Catholics, no other study retained this factor.

3.9 Occupation

At the national level, the prevalence of hypertension reported ranges from 17.4% among workers to 54.9% among retired or inactive people. In DR Congo, the prevalence of high blood pressure ranged from 38.8% among workers to 63.5% among the unemployed.

3.10 Household income

Households with low income or low socioeconomic level showed a prevalence of hypertension ranging from 30.3% in France to 54.5% in Mali. In the six DR Congo studies, this prevalence ranged from 26.4% in Kinshasa to 40.9% in Kisangani in households of high socioeconomic level. Low-income households recorded 9.4% in Kinshasa.

3.11 Tobacco and Alcohol

The prevalence of hypertension among tobacco users varies from 1.02% to 27.6% in China and France, respectively. For alcohol consumption, we found 1.07% to 48.3% in the works published by Xiaomei Dong in China and Laurence Frérot in France.

In DR Congo, Atoba et al found a prevalence of 32.1% among alcohol consumers in Kisangani, compared to 30% recorded by Kaniki in Mbuji mayi. The prevalence among smokers varied from 6.4% to 31.4% as reported simultaneously by Mupepe and Atoba et al.

However, Katchunga et al significantly observed the prevalence of hypertension in urban and rural areas of South Kivu among tobacco (11.6% Vs 1.2%) and alcohol (45% Vs 17.6%) users.

3.12 Salt intake

Maxime Dembélé in Mali found a prevalence of hypertension of 14.8% in cases of excess salt in the diet. The other publications did not address this factor.

On the other hand, in DR Congo, only Kaniki and Lulebo observed a prevalence of hypertension of 66.7% and 6.3% respectively in Mbuji mai and Kinshasa in case of excessive salt intake in the diet.

3.13 Overweight

Among the studies conducted at the national level, the prevalence of hypertension in overweight or obese subjects was 66.9% in France, 45% in the Antilles-Guyana and 17.2% in Mali. The highest values were found by Katchunga in South Kivu with 63.8% and 54.5% respectively among obese and overweight subjects.

3.14 Sedentary lifestyle

Apart from Maxime Dembélé in Mali who found a prevalence of 5.3% among sedentary people, no other study has identified this factor. In DR Congo, this prevalence was observed in South Kivu (42.4%), Kisangani (29.7%) and Kinshasa (24.8%).

3.15 Household size

Only Laurence Frérot & al in France found a prevalence of hypertension of 38.7% and 28.6% respectively in households with more than 6 children and one person. In Kisangani, Atoba et al reported a prevalence of 36.1% in individuals with more than three dependents.

3.16 Stress

No national level study has addressed this factor. In Kinshasa, Lulebo et al in 2013 observed a prevalence of 67.6% in case of stress against 43.2% found in South Kivu by Katchunga et al in 2011.

3.17 Heredity

Apart from Maxime Dembélé in Mali who reported a prevalence of hypertension of 17.2% in people from hypertensive parents, no other publication has addressed this factor. In the DR Congo, Atoba et al found significant results of 34.3% for heredity of hypertension and 36.4% for obesity.

3.18 Other factors

In the studies carried out at national level, we found that the following factors were documented only by Laurence Frérot et al in France: housewives (18.3%), social security coverage (34.4%), social protection (social security 33.6%), exemption from co-payment (exempt for illness 45.1%). In DR Congo, Atoba et al in Kisangani retained the status in the household with a prevalence of hypertension of 31.4% among the head of household.

3.19 Recommendations

The recommendations made concerned the general population, health care personnel and hypertensive patients. They focused more on prevention, social and behavioral change, improved screening strategies, etc.

IV. Discussion

In DR Congo, studies conducted in the cities of Mbuji mayi, Kinshasa and Kisangani reported a prevalence of 14.4%, 26.7% and 28% respectively. The highest prevalence in urban and rural areas was observed in South Kivu (41.4% Vs 38.1%). The city of Kinshasa recorded a low prevalence of 12% in urban areas and 9.9% in rural areas.

According to Vital, this prevalence is close to that reported in the United States where 31% of subjects aged 18 years and over were hypertensive. On the other hand, it is higher in urban areas than that found among Americans of African origin: in this group, the prevalence of hypertension was 38.6% [25]. Indeed, a survey conducted in different settings in four sub-Saharan African countries revealed variable prevalence rates depending on the country and the setting: 32% in Namibia in the urban communities of greater Windhoek and 23.7% in Tanzania. Damasceno et al. in a survey conducted in Mozambique reported a prevalence of 31.1% [26].

In published studies in four cities of the DR Congo, the mean age of predilection for hypertension ranged from 40 to 64 years.

Among the studies that reported prevalence of hypertension by sex, it varied in men and women according to location and duration, with prevalence ranging from 24.7% to 56% in men and from 21.8% to 68.7% in women. The highest prevalence of hypertension was recorded in women with 68.7% in Mali by Maxime Dembélé in 2010. Among men, Fang & al found 56% in China in 2014. In DR Congo, this prevalence ranges from 16.8% to 29% in men and 11.2% to 76% in women.

This predisposition of urban women to have more hypertension than men seems to be related to a number of factors including the use of hormonal contraceptives with high estrogen content, acquired and physiological obesity in women, abuse of anorectics and non-steroidal anti-inflammatory drugs [30].

Simpara, Cenac et al, Koate et al cited by Dembélé came to the same conclusion, as did other authors in Niger, Senegal where the hypertensive population included 56% of women and 44% of men and in South Africa where 25.8% of women were hypertensive, versus 13.4% of men [30].

At the national level, the few publications consulted reported a prevalence of 32.9% in Singapore and 78.9% in Mali among married people. On the other hand, Jocelyn Inano in 2008 in the Antilles-Guyana observed among married men 23.4% and 19.7% among women and a higher prevalence of 45.8% among widows.

The work done by Lulebo et al in 2013 in Kinshasa found 46.5% of hypertensives among married people and 40.5% among individuals with secondary education compared to 61.5% observed by Atoba et al among those without education. Apart from Lulebo et al in Kinshasa who recorded 48.9% of hypertensive individuals among Catholics, no other study has retained this factor [18,27].

Furthermore, in DR Congo, the prevalence of hypertension varies from 38.8% among workers to 63.5% among the unemployed. It ranged from 26.4% in Kinshasa to 40.9% in Kisangani in households of high socioeconomic level. Low-income households recorded 9.4% in Kinshasa.

The results of the study by Atoba et al found a prevalence of 32.1% among alcohol users in Kisangani compared to 30% recorded by Kaniki in Mbuji mayi. The prevalence among smokers varies from 6.4% to 31.4% as reported by Mupepe and Atoba et al [18, 22, 23].

However, Katchunga et al significantly observed the prevalence of hypertension in urban and rural areas of South Kivu among tobacco (11.6% Vs 1.2%) and alcohol (45% Vs 17.6%) users [7].

In fact, whether passive or active, cigarette smoking is a major and independent risk factor for arterial disease of the limbs and cardiovascular disease. Cigarette smoking appears to be the first risk factor (70%) of myocardial infarction with a consumption of more than 20 cigarettes/day exclusively by men [23].

Nicotine increases the release of adrenaline and noradrenaline, which increases blood pressure, heart rate and oxygen consumption of the heart muscle, the myocardium. Smoking has little effect on blood pressure but greatly increases the risk of clot formation in denatured arteries and even the risk of myocardial infarction, stroke and occlusion of leg arteries. All efforts to reduce the risk of hypertension will be useless if the hypertensive patient continues to smoke [22].

Only Kaniki and Lulebo observed a prevalence of 66.7% and 6.3% respectively in Mbuji mai and Kinshasa in case of an exaggerated salt intake in the diet. The role and importance of dietary salt in blood

pressure regulation is controversial. However, Swift et al. have demonstrated the beneficial effect of reducing sodium intake on blood pressure in adult black hypertensive subjects [20].
In this review, the highest values for overweight were found by Katchunga in South Kivu with 63.8% and 54.5% respectively in obese and overweight subjects [7, 22, 28].
Except for Maxime Dembélé in Mali who found a prevalence of 5.3% among sedentary people, no other study has retained this factor [30]. In DR Congo, this prevalence was observed in South Kivu (42.4%), Kisangani (29.7%) and Kinshasa (24.8%). However, in subjects with more than three dependents, Atoba et al reported 36.1% in Kisangani.
In case of stress, Lulebo et al observed 67.6% in Kinshasa against 43.2% found in South Kivu by Katchunga et al. Atoba et al found significant results of 34.3% in case of heredity of hypertension and 36.4% for obesity [7, 18, 28].

The analysis of the consulted publications revealed that the prevalence of hypertension increases with age, financial income level, social burden, level of responsibility in the household (status in the household), intake of alcoholic beverages, sedentary lifestyle and obesity. The latter, both generalized and abdominal, is closely related to hypertension. Hereditary history of hypertension and/or obesity is associated with a higher prevalence of hypertension [26].

Indeed, recent cultural changes in sub-Saharan Africa, including the adoption of the Western lifestyle, are a major factor in the increased prevalence of hypertension and other cardiovascular risk factors such as obesity, alcoholism and sedentary lifestyle [27].

In sub-Saharan Africa, an obese subject is 3 times more likely to be hypertensive than a non-obese one (OR= 3.10 95% CI= 2.11-4.55) [36]. There is therefore an urgent need to redefine the standards of beauty and social success and especially to insist on diet in the management of hypertensive patients.

In this review of the literature, we found that the following factors were documented only by Laurence Frérot et al in France: housewives (18.3%), social security coverage (34.4%), social protection (social security 33.6%), exemption from co-payment (exempt for illness 45.1%). In DR Congo, Atoba et al in Kisangani retained the status in the household with a prevalence of hypertension of 31.4% in the head of the household [18, 29].

V. Conclusion

Hypertension, because of its prevalence, severity, and disabling consequences, is a major public health burden in the DR Congo. However, we found no national study on the socioeconomic determinants of hypertension. Therefore, physicians have a major role to play by adopting a policy of cooperation in research so that the results obtained can have beneficial consequences for the populations. Such cooperation should seek to create and organize national research on hypertension and its risk factors. This will be essential to institute a coherent process of decision making and effective therapeutic management in our country.

Funding: This study did not receive specific funding from any public, commercial, or nonprofit agency.

Authors' Contributions and Responsibilities: All authors attest to compliance with the criteria of the International Committee of Medical Journal Editors (ICMJE) regarding their contribution to the article. All authors contributed to the conduct of this research and to the writing of the manuscript. They have all read and approved the final version.

Declaration of interests: The authors declare that they have no interests.

References

[1]. Kearney PM, Whelton M, Reynolds K et coll. Global burden of hypertension: analysis of worldwide data. Lancet 2005 ; 365 : 217-23.
[2]. Causes of death 2008 [base de données en ligne]. Genève, OMS. http://www.who.int/healthinfo/global_burden_disease/cod_2008_sources_methods.pdf.
[3]. Lim SS, Vos T, Flaxman AD, Danaei G, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010 : a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012 ; 380(9859) : 2224-60.
[4]. Organisation mondiale de la santé. Panorama mondial de l'hypertension : Un tueur silencieux responsable d'une crise mondiale de santé publique. Genève : OMS ; 2013
[5]. Opie LH, Seedat YK. Hypertension in sub-Saharan African populations. Circulation 2005 ; 112 : 3562-8
[6]. Franco V, Oparil S. Salt sensitivity, a determinant of blood pressure, cardiovascular disease and survival. J Am Coll Nutr 2006 ; 25 : 247S-255S
[7]. Katchunga Philippe B, M'Buyamba-Kayamba Jean-René, Masumbuko Burhole E, Lemogoum Daniel, Kashongwe Zacharie M, Degaute Jean-Paul, Kabinda Jeff M, M'Buyamba-Kabangu Jean-René. Hypertension artérielle chez l'adulte Congolais du Sud Kivu: résultats de l'étude Vitaraa. Presse Med. 2011;6(4):315–323. [PubMed] [Google Scholar]

[8]. M'Buyamba-Kabangu JR, Fagardr ST, Lijnen P, Amery A. Corrélats de la pression artérielle dans les zones rurales et urbaines du Zaïre. J Hypertens. 1987; 5 : 371–375.

[9]. M'Buyamba-Kabangu JR, Fagard R, Lijnen P, Staessen J, Ditu MS, Tshiani KA, et al. Epidemiological study of blood pressure and hypertension in a sample of urban Bantu of Zaire. J Hypertens. 1986;40(6):485–92. [PubMed] [Google Scholar]

[10]. Longo MB, Ngoma VD, Nahimana D, Mupepe MD, Mbungu FS, Ekwanzala F, Beya C. Détection de dépistage et approche par étapes de l'OMS pour la prévalence et les facteurs de risque de l'hypertension artérielle à Kinshasa. Eur J Cardiovasc Prev Rehabil. 2008; 15 : 503–508.

[11]. Tambwe M, Mbala-mukendi M, Dikasa LN, M'buyamba-kabangu JR. Morbidity and mortality in hospitalized Zairean adults. South Afr J Med 1995; 85:74.

[12]. Omran AR. The epidemiologic transition, the key of the epidemiology population change. Milibank Memorial fund Q, 1971, 49: 509-538.

[13]. Srinath KR, Yusuf S. Emerging epidemic of cardiovascular disease in developing countries. Circulation 1998; 97 :596-601.

[14]. Pressart R. L'analyse démographique. Concept-Methodes. PUF : Paris ; 1983

[15]. Nkoy Belila J. Facteurs de risque cardiovasculaire, maladies cardiovasculaires et gradient social en milieu professionnel (cas de la SNEL). [Mémoire de spécialisation].Université de Kinshasa : Kinshasa ; 2002.

[16]. Mulanda. Les facteurs de risque cardiovasculaire et le football chez les jeunes à Kinshasa. [Mémoire de licence en Médecine Physique et réadaptation]. Université de Kinshasa : Kinshasa ; 2006.

[17]. Enquête sur les facteurs de risque des maladies non transmissibles à Madagascar. MINSAN/PF, 2005.

[18]. Atoba B.C.R., Kayembe T.C., Batina A S., Mbo M. J.P., Ngandu W.N.L. C., Tsongo K. Z., Bolukaoto B. L., Tshitenge B. W., Bakili H. A., Kambale K.P., Kazadi M.D., Ossinga B.J., Poyo S.M., Losimba L.J. Prévalence, connaissance et degré de contrôle del'hypertension artérielle à Kisangani, RD Congo. KisMed Décembre 2014, Vol 5(2) : 86-93

[19]. Bodenmann P *& al*. Précarité et déterminants sociaux de la santé : quel(s) rôle(s) pour le médecin de premier recours ? *Revue médicale suisse*, 2009, vol. 5, no. 199, p. 845-849

[20]. Antchouey Anne-Marie, Goulet Lise & Hamet Pavel. L'hypertension artérielle en Afrique sub-saharienne: Déterminants intrinsèques, comportementaux, et socio-économiques. Tropical-cardiology. Volume 15, Numéro 129, Juin-Juillet-Aout 2011.

[21]. Aimée M. Lulebo , Paulin B. Mutombo , Mala A. Mapatano , Eric M. Mafuta , Patrick K. Kayembe , Lisa T. Ntumba, Alain N. Mayindu et Yves Coppieters .Facteurs prédictifs du non-respect des antihypertenseurs à Kinshasa, République démocratique du Congo: une étude transversale.

[22]. Kaniki P C. Prévalence de l'hypertension artérielle à Mbujimayi, cas de la commune de la Kanshi. [TFC]. Université de Mbujimayi; 2008

[23]. Mupepe Mayuku D. Enquête de prévalence des facteurs de risque des maladies non transmissibles (chroniques) à Kinshasa. [Mémoire de spécialisation].Université de Kinshasa.Kinshasa ; 2006

[24]. Kearney PM, Whelton M, Reynolds K et coll. Global burden of hypertension: analysis of worldwide data. Lancet 2005 ; 365 : 217-23.

[25]. Vital signs: prevalence, treatment, and control of hypertension–United States, 1999–2002 and 2005–2008. 2011. pp. 103–108. MMWR Morb Mortal Wkly Rep. United States.

[26]. Kayima J., Wanyenze R. K, Katamba A., Leontsini E. and Nuwaha F.Hypertension awareness, treatment and control in Africa: a systematic review. BMC Cardiovascular Disorders 2013, 13: 54.

[27]. Lulebo A, Mutombo P, Mapatano M, Mafuta E, Kayembe P, Ntumba L, Mayindu A & Coppieters Y. Facteurs prédictifs du non-respect des antihypertenseurs à Kinshasa, RDC : Une étude transversale. https://www.ncbi.nlm.nih.gov/pmc/articles/pmc4591704.

[28]. Ministère de la santé & OMS. Enquêtes sur les facteurs de risque des maladies non transmissibles à Kinshasa, capitale de la RD Congo selon l'approche STEPS de l'OMS : Rapport d'analyse. Kinshasa(RDC), Novembre 2006.

[29]. Laurence Frérot, Philippe Le Fur, Annick Le Pape & Catherine Sermet. L'hypertension artérielle en France : prévalence et prise en charge thérapeutique. Rapport n° 484 (biblio n° 1276). Paris : CREDES ; Septembre 1999.

[30]. DEMBELE Maxime. La place de l'hypertension artérielle dans le milieu spécialisé cardiologique du chu Gabriel Toure. [Thèse de Doctorat en Médecine]. Université de Bamako ; 2010

[31]. Nakalema I , Kaddumukasa M , Nakibuuka J , Okello E , Sajatovic M & Katabira E . Prévalence, caractéristiques et facteurs associés aux crises hypertensives au service des urgences de l'hôpital de Mulago : une étude transversale. https://www.ncb.nlm.nih.gov/pubmed/ ?term=nakalema.

[32]. 32.Liu X , Gu W , Li Z , Lei H , Li G & Huang W . Prévalence de l'hypertension, sensibilisation, traitement, contrôle et facteurs associés dans le sud-ouest de la Chine. https://www;ncb.nlm.nih.gov/pubmed/ ?term=liu.

[33]. Liew SJ , Lee JT , Tan CS, Koh CHG , Van Dam R & Müller-Riemenschneider F. Facteurs sociodémographiques liés à la prévalence, à la sensibilisation, au traitement et au contrôle de l'hypertension dans une population multiethnique asiatique: une étude transversale. . https://www.ncb.nlm.nih.gov/pubmed/ ? term=lieu.

[34]. Fang L, Chant J , Ma Z , Zhang L , Jing C , Chen D. Prévalence et caractéristiques de l'hypertension chez les adultes chinois de Chine continentale au fil des décennies: revue systématique. *Journal of Human Hypertension* Volume 28, 649 - 656 (2014)

[35]. 35.Dong X , Rao de Jiaming , Ye Y , Pang M , Yang J , Wang H , Zhang J , Pan B , Wu X & Chen X. Tendances et facteurs associés d'hypertension chez les résidents âgés de 15 ans et plus à Guangzhou, Chine, 2004-2013. https://www.ncb.nlm.nih.gov/pubmed/ ? term=dong.

[36]. 36. Chobanian AV, Bakris GL, Black HR et al. The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. JAMA 2003; 289 : 2560–71.