

Target Organ Damage in Newly
Diagnosed Hypertensive Individuals in
Yaoundé, Sub Saharan AfricaChris Nadège Nganou Gnindjio^{1,2*}, Bâ Hamadou^{1,2}, Jérôme Boombhi^{1,3}, Jacques Philippe E Essomba¹, Liliane Mfeukeu Kuate^{1,2}, Rodrigue A Njouoguep⁴, Christian N Ouankou^{1,5}, Sylvie Ndongou Amougou^{1,5}, Aurel T Tankeu¹, Alain Patrick Menanga^{1,3} and Samuel Kingue^{1,3}¹Department of Internal Medicine and Specialties, University of Yaoundé I, Cameroon²Department of Cardiology, Yaoundé Central Hospital, Cameroon³Internal Medicine Department, Yaoundé General Hospital, Cameroon⁴Centre des Urgences de Yaoundé, Yaoundé, Cameroon⁵Internal Medicine Department, Yaoundé University Teaching Hospital, Cameroon

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*Corresponding author

Chris Nadège Nganou-Gnindjio,
Lecturer in Internal Medicine and
Cardiology, Department of Internal
Medicine and Specialties, Faculty of
Medicine and Biomedical Sciences,
University of Yaoundé I, Yaoundé,
Cardiology Department, Yaoundé
Central Hospital, Yaoundé, Cameroon,
Tel: +237 2 22 22 13 20;
Email: cn_nganou@yahoo.fr

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Abstract

We aimed to determine the patterns and prevalence hypertensive complications among newly diagnosed individuals in Yaoundé.

This cross-sectional study from January to April 2017 in four references hospitals of Yaoundé with newly diagnosed hypertensive (less than 6 months) patients, aged over 18 years. Qualitative variables were described as count and percentage while quantitative data were described by mean \pm standard deviation.

Overall, 338 patients (188 women) with a mean age of 57 ± 12 years were included. The most frequent cardiovascular risk factors were dyslipidemia (71%), physical inactivity (69.82%) and obesity (68%). 84.6% of our sample presented at least one target organ damage at diagnosis. Stroke (mainly ischemic) was the most frequent complication found in 31.7%

The increasing prevalence of hypertension in our context is associated with an important proportion of target organ damage at diagnosis.

Introduction

Cardiovascular Diseases (CVDs) are the leading cause of death globally. In 2015, about 17.7 million people died from CVDs representing 31% of all global deaths. Over three quarters of CVD deaths take place in low- and middle-income countries [1]. Hypertension is the most frequent modifiable risk factor for cardiovascular disease (CVD) and death [2]. Worldwide, raised blood pressure is estimated to cause 7.5 million deaths, about 12.8% of the total of all deaths. This accounts for 57 million disability adjusted life years (DALYs) or 3.7% of total DALYs [3]. This situation is worse by the scarcity of clinical manifestations and signs of the disease. Therefore, in absence of regular check-up and monitoring of blood pressure, the diagnosis is usually made during a complication. Given, that, hypertension is also referred as “silent killer” due to the frequent occurrence of major complications and deaths in patients presenting high blood pressures figures without any clinical signs [4]. Across the WHO regions, the prevalence of raised blood pressure was highest in Africa, where it affected 46% of adults aged over 25 years [5]. It represented the leading cause of death in sub Saharan Africa in 2010 with a two third increase during the last two decades [6,7]. Hypertension is the major cause of 50% of heart disease, stroke and heart failure. It is involved in 13% of deaths overall and the leading risk for renal failure [8]. In Cameroon, one third of adults have high blood pressure but most of patients are unaware of their disease and are at risk of developing related complications even before the diagnosis [2]. One decade ago, a community study revealed that up to 86% of newly diagnosed hypertensive patients were unaware of their status, among those already diagnosed, only 46% were treated and less than 5% were controlled [9]. This low awareness associated to low literacy added to limited resources contributed to delay the diagnosis of hypertension in our context. Therefore, patients usually presented with already existing complications. However, studies estimating these conditions usually associated with hypertension at diagnosis in sub Saharan Africa are scarce. We aimed to determine the patterns and prevalence hypertensive complications among newly diagnosed individuals in Yaoundé.

Methods

Ethical considerations

This study was performed in accordance with the guidelines of the Helsinki Declaration and was approved by the Institutional Research Ethical Committee of the Faculty of Medicine. All participants provided written informed consent.

Study design and sampling

This was a cross-sectional study carried out from January 2017 to April 2017 in four referenced hospital of the capital of Cameroon namely the Yaoundé Central Hospital, Yaoundé General Hospital, University Teaching center and the reference emergency Center. Patients were recruited in outpatient cardiology consultations, emergency departments as well as internal medicine, cardiology, neurology and resuscitation services. We included newly diagnosed hypertensive (less than 6 months) patients, aged over 18 years present in one of our recruitment settings and who provided written informed consent. Patients with long lasting hypertension and those presenting diabetes were excluded in order to avoid confusion since diabetes can lead to the same complications as hypertension.

We used a consecutive sampling. The minimum sample size for the study was determined by as follows: $n = t^2 \times p (1-p) / m^2$

n = minimum sample size, t = 95% confidence level = 1.96, p = prevalence of hypertensive patients in a given region, m = margin of error at 5%. The most recent prevalence of hypertension in Cameroon being 29.7% [3], we calculated:

$n = (1.96)^2 \times 0.297 (1-0.297) / 0.05^2 = 320.83$. The minimum sample size was 321 patients.

Data collection and procedure

Patients were invited to participate during their consultation for outpatients and after check-up of medical files in search of high blood pressure figures and/or complications or conditions usually associated with hypertension for in hospital patients. Then, blood pressure was measured for patient found in outpatient consultation on a resting and calm individual, previously sitting for least 5 minutes. Measurements were made on both arms with an adapted cuff. When there was marked difference among the two values (more than 5mmHg on one component), subsequent measurements were made on the arm with the highest value and the mean of two measures was considered for analysis. For patients already diagnosed with hypertension, the initial BP was reported from the medical record. This was followed by data collection using a pre designed questionnaire focusing on socio-demographic data, lifestyle, clinical parameters, paraclinical investigations and finally complications found at diagnosis. Clinical and paraclinical data were taken in patient record for in hospital patients and in medical book for outpatients.

Data analysis

Data entry was done using Epi data software version 3.1 and analyzed by using IBM SPSS Statistics for Windows, version 21.0. (Armonk, NY: IBM Corp.). Qualitative variables were described as count and percentage while quantitative data were described by mean \pm standard deviation.

Results

Participant's characteristics

Overall, 349 patients were eligible for the study but 11 have concomitant diabetes and were therefore excluded. Our included 338 patients (188 women) aged of 57 ± 12 years with a maximum of 91 years and a minimum of 30 years. The most represented age groups were: 50-59 years with 33.7% (114/338). The major complaints on admission were motor deficit or weakness of limbs (29.3%), headaches (21.3%) and dyspnea (13.02%). Concerning severity of hypertension, grade 3 hypertension was the most found (51%), followed by grade 2 (33.2%) and grade 1 (15.1%). Isolated systolic hypertension represented less than 1% of hypertension in our sample (0.7%). The mean SBP was 178 ± 12 mmHg with a minimum of 136 mmHg and a maximum of 280mmHg. The mean DBP was 106 ± 08 mmHg ranging from 68 to 182 mmHg.

Cardiovascular risk factor

The most frequent cardiovascular risk factors were: dyslipidemia found in 71% of our patients, physical inactivity (69.82%) and abdominal obesity (69.82%). 68% of our patients were obese and 08% were active smokers. About 40% of our population was subject to chronic consumption of alcohol.

Hypertensive complications at diagnosis

84.6% of our sample presented at least one complication at the moment of hypertension diagnosis. Stroke was the most frequent complication (52.2% of all complications) and the discovery mode of hypertension in 31.7% of all participants. 59.1% of strokes were ischemic versus 40.9% cause by hemorrhage. The others main complications already existing at diagnosis of hypertension were Left ventricular hypertrophy which represents 35.5% of all complications and was found in 21.9% of our sample. Arrhythmia was the third complication (21.5%) affecting overall 13% of the study population. 12.13% of participants already presented kidney injury with stage 3 being the most frequent stage. Three percent (3%) of patients has already developed hypertensive heart failure at diagnosis while eye complications affected 2.3% of our patients. Acute coronary syndrome was the discovery mode of hypertension in 02/338 patients.

Discussion

This study was carried out to determine the patterns and prevalence hypertensive complications among newly diagnosed individuals in Yaoundé. We found that hypertension is usually diagnosed at stage 3. More than three quarter of patients diagnosed in our context already have target organ damage with stroke being the most frequent complication.

Hypertension is chronic disease characterize by progressive and permanent increase of blood pressure figure which is usually asymptomatic at the beginning but can lead to symptoms and clinical signs when BP values are too high [7]. This contributes to target organ damage such as stroke, cardiac abnormalities and dysfunctions as well as retinal and kidney injury among others. Frequent check-up of BP can allow early detection and diagnosis and efficient management reducing the cardiovascular and global risk for individual [10]. However, in limited resources settings, routine visits are scarce and

systematic health checks even non-existent especially in specialized medical services due to lack of financial resources (absence of health insurance) to cover the costs of consultations coupled with the scarcity or absence of structures and inadequacy of specialized doctors [11], the inaccessibility of these latter by certain classes of the general population, the cost of consultations and drugs being often expensive considering the MIGS of these countries [12]. Therefore, medical consultations are usually motivated either by appearance of serious clinical signs/complaint or by the occurrence of a condition that limit daily activity. This is supported by our study findings since no diagnosis of high blood pressure was done during check-up or a routine visit and all patients diagnosed with high blood pressure had a particular complaint with weakness of limbs being the most frequent. Moreover, the condition was detected in one third of patients during a complication (stroke). This suggests a late diagnosis when the pathology has already reached an advanced stage. More than half of our patients had grade 3 hypertension and only fifteen percent were diagnosed in stage 1 at the early stage of the disease. This is therefore a major concern given that cardiovascular risk is correlated and associated with elevation of blood pressure figures [3,13]. Indeed, according to the WHO, the cardiovascular risk doubles for each elevation of 20/10 mmHg of BP and this from 115/75 mmHg [3-5]. Therefore, each grade of hypertension is accompanied by a double cardiovascular risk compared to the previous stage. Thus, patients diagnosed with grade 1 already have a cardiovascular risk twice as high as those with optimal/normal BP, those with grade 2 hypertension, a risk four times higher than normal, and cardiovascular risk for patients with grade 3 hypertension is eight time more important than normal patients. Considering those facts, half of our sample already has a risk eight times higher than the normal population at the time of the diagnosis of hypertension, and one-third of patients have a risk at least four times higher than the normal range. This situation is worrying if one considers the high prevalence of this health problem in our population where it affects about one third of the adult subjects [2,9,14,15]. On the other hand, complications such as stroke found in one third of our patients at the time of diagnosis are associated with an important mortality and morbidity in our context [16,17] with an in-hospital mortality rate estimated at 20% [17,18]. Moreover, this mortality could be underestimated due to the low consultation rate associated to such condition that could lead to pre-hospital death even without diagnosis [19].

Another major concern raised by this study the important proportion of patient with target organ damage at diagnosis. Only fifteen percent of newly diagnosed patients were free from complication similar to the proportion of individuals with grade 1 hypertension in our sample. Given the fact that most of these complications are irreversible and associated with substantial morbidity and mortality, all precautions must be taken in order to prevent, avoid or delay their appearance and development. This requires early detection and diagnosis and efficient management. Therefore, in areas of low literacy and low awareness for chronic non communicable conditions like Cameroon and others parts of sub Saharan Africa with level of awareness reaching less than five percent of the population [9] (CAMBOD I and II), effective actions must be taken to improve awareness in order to allow earlier diagnosis and effective management of hypertension. This stress the need for an integrate action involving different stakeholders such as policy makers, community and local opinion leaders, health

care professionals, teachers, traditional health practitioners, health-related industry and business operators and others persons of interest susceptible to help influence and help improving awareness of the general population on the burden of hypertension in our context. Another important finding of this study is the high values of blood pressure at diagnosis in our study population were too high (median and mean blood pressure was at grade 2). These elevated BP figures at diagnosis constitute the base of difficulties encountered for blood pressure control [9,20] and could explained the high prevalence of resistant hypertension in our context [21]. This low level of control is even underestimated by office blood pressure measure and could be worse when using ambulatory monitoring devices [22].

However, this study has some limitations such as sampling method and site of study. Our study used a consecutive sampling and most patients came from emergency departments, internal medicine, cardiology, neurology and resuscitation services. The in-hospital recruitment can lead to overestimation of complications since patients admitted usually present more complications than others. However, the study was designed to include outpatient's consultations but the best study must be a community study.

Conclusion

The increasing prevalence of hypertension in our context is associated with a delay in diagnosis leading to an important proportion of target organ damage and development of complication in more than eighty percent of patients even before diagnosis.

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