

## Target Organ Damage in Newly Diagnosed Hypertensive Individuals in Hospital Setting in Yaoundé

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### Abstract

**Background:** Hypertension is the major cardiovascular risk factor almost affecting one third of adults in Cameroon. As chronic and insidious condition, high blood pressure can cause target organ damage even when the patients are still unaware of their status. This situation is worse by limited resources and low awareness in our context leading to high frequency of complications at diagnosis. We aimed to determine the patterns and prevalence of hypertensive complications among newly diagnosed individuals in hospital setting in Yaoundé.

**Methods:** We carried out a cross-sectional study from January to April 2017 in four references hospitals of Yaoundé. 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 who provided written inform consent. Patients with long lasting hypertension and those presenting with diabetes were excluded. Data collection was done using a structured, self-administered questionnaire and medical information collected from medical record. Qualitative variables were described as count and percentage while quantitative data were described by mean  $\pm$  standard deviation.

**Results:** Overall, 338 patients (188 women) with a mean age of aged of  $57 \pm 12$  years were included. Major complaints on admission were weakness of limbs (29.3%), headaches (21.3%) and dyspnea (13.02%). Grade 3 hypertension was the most found (51%). 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% of participants followed by left ventricular hypertrophy (21.9%) and arrhythmia (13%).

**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 at diagnosis in more than eighty percent of patients.

**Keywords:** Hypertension; Target Organ Damage; Newly Diagnosed; Yaoundé

### 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, about 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 associated with hypertension at diagnosis in sub Saharan Africa are scarce. We aimed to determine the prevalence and patterns of hypertensive complications among newly diagnosed individuals in Yaoundé.

## **Material and Methods**

### **Study design and sampling**

This was a cross-sectional study carried out on four months 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 inform consent. Patients already known as hypertensive and those presenting with diabetes were excluded in order to avoid confusion since diabetes can lead to some complications found in 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**

Outpatients were invited during their medical consultation. Past medical history was obtained by checking medical books in search of high blood pressure figures or others conditions usually associated with hypertension. Then, blood pressure was measured 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 5 mmHg), subsequent measurements were done 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. Socio-demographic data, lifestyle, clinical parameters, paraclinical investigations and complications were collected using a pre-designed questionnaire. Hypertensive complication searched were stroke, heart failure, left ventricular hypertrophy, acute coronary syndrome and hypertensive retinopathy. They were ascertained by checking the paraclinical investigation which served for the diagnosis.

### **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 frequencies and percentages while quantitative data were described by their 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. We included 338 patients (188 women) aged of  $57 \pm 12$  years with a maximum of 91 years and a minimum of 30 years. The most represented age range was 50 - 59 years with 33.7% (114/338). The major complaints on admission were 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 cases our sample. (0.7%). The mean SBP was  $178 \pm 12$  mmHg with a minimum of 136 mmHg and a maximum of 280 mmHg. The mean DBP was  $106 \pm 08$  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%). Obesity was found in 68% of our patients, tobacco smoking in about 08% while 40% were subject to chronic consumption of alcohol (Table).

Cardiovascular risk factors	Count (%)
Alcohol consumption	120 (40)
Smoking	31 (7.8)
Family history	130 (32.5)
Abdominal obesity	221 (55.3)
Obesity	270 (67.5)
Sedentarity	297 (74.3)

### Hypertensive complications at diagnosis.

84.6% of our sample presented with at least one complication at the moment of hypertension diagnosis. Stroke was the most frequent complication (52.2% of complications found) and lead to diagnosis of hypertension in 31.7% of cases. About two thirds of these strokes were ischemic (59.1%) and 40.9% were due to hemorrhage. Others complications already existing at diagnosis of hypertension were Left ventricular hypertrophy which represents 35.5% of complications and was found in 21.9% of our population (Table 1). Three percent (3%) of patients already presented hypertensive heart failure at diagnosis while hypertensive retinopathy was present in 2.3% of our patients. Acute coronary syndrome was found in 02/338 patients and lead to the diagnosis in this two cases.

Hypertensive complications	Count (%)
Stroke	107 (31.65)
Heart failure	10 (2.9)
Left ventricular hypertrophy	74 (21.9)
Acute coronary syndrome	2 (0.6)
Kidney injury	41 (12.1)
Hypertensive retinopathy	8 (2.4)

**Table 1:** Frequencies of hypertensive complications.

## Discussion

This study was carried out to determine the prevalence and patterns of 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 a target organ damage with stroke being the most frequent complication.

Hypertension is characterized 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, left ventricular hypertrophy as well as hypertensive retinopathy. Frequent check-up of BP can allow early detection and help reducing complications [10]. However, in limited resources settings, routine visits are scarce and systematic health checks even non-existent especially in specialized medical services mostly due to limited financial resources and inadequacy between numbers of specialized doctors and the population [11,12]. Therefore, medical consultations are usually motivated either by appearance of a major complaint or limitation in daily activity. This is supported by our study findings since almost all participants diagnosed with high blood pressure present a major complaint. Moreover, hypertension was revealed in one third of patients by a complication. In addition, 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 suggests a late diagnosis when the pathology has already reached an advanced stage. This is therefore a major concern given that cardiovascular risk is correlated and associated with elevation of blood pressure figures [3,13]. 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]. Another major concern raised by this study is the important proportion of patients 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. Another important finding of this study is the high values of blood pressure at diagnosis in our study population. These elevated blood pressure figures at diagnosis constitute the base of difficulties encountered for blood pressure control [19,20] and could explain 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].

### Limitations

However, this study has some limitations such as sampling method and site of study. Most patients came from emergency departments, internal medicine, cardiology, neurology and resuscitation services meaning that most of them were admitted for management of a medical condition or a complication. The hospital setting and the choice of reference health facilities can lead to overestimation of complications since patients admitted are usually referred for complications management. Therefore, a community study would better estimate the prevalence and patterns of hypertensive complication at diagnosis.

### 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.

### 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.

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