Hypertension among Outpatients at a General Hospital in South Angola: Prevalence, Awareness, Treatment, and Control

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ABSTRACT

OBJECTIVE: This study aimed to assess the prevalence, awareness, treatment, and control of hypertension in patients attending an outpatient clinic at a general hospital in Huambo, South Angola.

METHODS: A total of 265 subjects aged 18 years and older were included. Evaluation included complete interview and blood pressure measurement using a validated automatic device.

RESULTS: The prevalence rates of hypertension and prehypertension were 38.5% (95% confidence interval [CI]: 32.83%–44.90%) and 30.20% (95% CI: 24.52%–36.22%), respectively. Hypertension was associated with age (>35 years; odds ratio [OR] = 10.09, 95% CI: 5.46–18.66, $P < 0.01$) and female gender (OR = 1.81, 95% CI: 1.08–3.05, $P = 0.02$). Among total hypertensive patients, 54.9% were aware of their diagnosis, 28.43% were in treatment, and 7.84% had controlled blood pressure. Lack of awareness was significantly higher in younger (age ≤ 37 years; OR = 3.28, 95% CI: 1.13–9.49, $P = 0.02$).

CONCLUSION: This study revealed a high prevalence of hypertension, with low awareness, treatment, and control rates. Greater efforts are necessary to overcome these challenges.

KEYWORDS: hypertension, prevalence, awareness, treatment, control, Angola

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Introduction

Hypertension is the major risk factor for cardiovascular disease (CVD),[1] which is the leading cause of mortality worldwide.[2,3] Studies have shown that developing countries have the largest absolute number of people with hypertension and suffer a greater impact from the growing burden of chronic diseases like hypertension.[4,5]

In Sub-Saharan Africa, the prevalence of hypertension has been increasing,[6,7] and it is one of the risk factors that showed the highest increase from 1990 to 2010 in this region.[8] In parallel, from 1990 to 2013, an increase of 81% in cardiovascular mortality occurred in this region.[9] However, Sub-Saharan Africa remains the region of the world where published data on the prevalence, treatment, and control of hypertension are lacking.[10,11]

In Angola, estimates show that 9% of 301,000 deaths occurred due to CVDs in 2012,[12] with 24.2% of probability of premature death (aged between 30 and 70 years) due to noncommunicable diseases (NCDs).[12] Little is known about the prevalence of hypertension (and prehypertension) in the general population. In the few existing studies, the prevalence varied between 23% and 45.2%,[13,14] but in clinical practice, it is undiagnosed and undertreated, often presenting as a hypertensive emergency, with target organ damage (TOD) in early ages compared to the world average.[13,15,16]

In Huambo, South of Angola, no published study to date has assessed hypertension and its associated risk factors. The current population context in the province is characterized by increased life expectancy and unhealthy lifestyle habit adoption, which in interaction with the racial factor and other health determinants force toward epidemiological transition. Therefore, it is important to study this condition in the population, principally in the setting of 25 × 25 global target, which aimed a 25% relative reduction in premature mortality from main NCDs between 2010 and 2025.[17] The aim of this study was to assess the prevalence, awareness, treatment, and control of hypertension, as well as associated factors in patients attending an outpatient clinic at South Angolan hospital.

Patients and Methods

Population and study design. A cross-sectional study was conducted with 265 subjects aged 18 years and older, attending the outpatient medical service of the General

Hospital of Huambo, in September 2015. Huambo is a province of southern Angola, with an area of 34.274 km^2 and about 1.8 million inhabitants.[18] The General Hospital of Huambo is a tertiary hospital, whose outpatient service attends about 2400 to 5000 patients aged 18 years and older each month, most of them from the peri-urban area. Despite being a tertiary hospital, most patients in the outpatient service are of primary care profile, due to patient flow diversion that arises from the system deficiency, with a defective flow regulation between primary care and reference services. Thus, most patients are attended based on subacute and mild symptoms and seek services spontaneously. Since they do not meet the criteria to be evaluated in the emergency services, they are attended by this outpatient service. Most patients seek assistance without previously diagnosed chronic comorbidities and are seen in a general medicine or surgery consultation. Among the few with a previous diagnosis are those with surgical pathology, in evaluation for elective surgery, and those in postorthopedic trauma follow-up. Therefore, the study subjects are more a non-representative fraction of the general population than an appropriately referenced tertiary hospital population.

A sample size was calculated, expecting a hypertension prevalence of 24%, based on the adjusted estimate for the average age,[6] assuming precision of 5%, 95% confidence interval (CI), and a design effect of 1. All individuals aged 18 years and older, who attended a consultation during the period of data collection (in September), were invited to participate and were included consecutively until to complete the calculated sample. Pregnant women were excluded because their inclusion would cause a significant difficulty in separating those with chronic hypertension, from those with gestational hypertension and/or preeclampsia, in a population where the knowledge of chronic NCD is low. This is reinforced in the context of limited resources, from basic laboratory tests such as proteinuria, technological resources such as a computerized system to retrieve information about previous health of the woman, until human resource limitations. During data collection, 276 patients completed the evaluation, but 11 patients were excluded because of erroneous or incomplete data. Therefore, the final analysis included 265 patients.

Study variables. Data were collected using a questionnaire, with questions about age, gender, personal medical history, medication use, and smoking history. The questionnaire also included questions about knowing to be hypertensive, told by a health-care professional after blood pressure (BP) measurement, and prescribed medication for hypertension. Those who reported being on antihypertensive medication were evaluated whether they had BP $<$ 140/90 mmHg on study measurement, in which situation we considered that they were with controlled BP.

BP was evaluated according to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) recommendations,[19] at the arm level, by the oscillometric method, with digital automatic device, OMRON M6 Comfort (HEM-7221-E; OMRON Healthcare Co., Ltd.), tested and calibrated by the manufacturer, and validated according to the European Society of Hypertension International Protocol.[20] We categorized the population into three subgroups based on a single measurement BP value: normotensives (BP below 120/80 mmHg), prehypertensives (systolic BP between 120 and 139 mmHg and/or diastolic BP between 80 and 89 mmHg), and hypertensives (systolic BP $\geq$ 140 mmHg and/or diastolic BP $\geq$ 90 mmHg).[19] Those on medication for previously diagnosed hypertension were considered as hypertensives, regardless of BP value.

Statistical analysis. The data were stored in a common database and subjected to descriptive statistical analysis according to specific variables. We calculated the prevalence of prehypertension and hypertension in the general sample and specific by age and gender. The association between independent and dependent variables was evaluated by odds ratios (OR) with 95% CI, accepting a level of significance for $P < 0.05$. Analyses were performed with the program OpenEpi version 3.03 (public domain).

Ethical considerations. The study procedures were performed only after informed verbal consent was obtained from participants or those responsible for them, without any registration, because a considerable portion of the subjects were illiterate, so they do not know how to sign. The confidentiality of patient identification and individual data was guaranteed. All research procedures were evaluated and approved by the Scientific and Pedagogical Board of the hospital, that is, the organ responsible for ethical issues in research at the institution, in the absence of formal ethical committee in the province. The research was conducted in accordance with the principles of the Declaration of Helsinki.

Results

A total of 265 patients were included, the median age was 36 years (range 18–91 years), and 60% (159) were women, without significant age difference between genders, and all black Africans. Baseline demographic and clinical characteristics of patients are presented in Table 1.

The overall prevalence rates of hypertension and prehypertension were 38.5% (n = 102; 95% CI: 32.83%–44.90%) and 30.2% (n = 80; 95% CI: 24.52%–36.22%; Fig. 1), respectively. The occurrence of hypertension was significantly associated with age (>35 years; OR = 10.09; 95% CI: 5.46–18.66, $P < 0.01$) and female gender (44.03% vs. 30.19%; OR = 1.81, 95% CI: 1.08–3.05, $P = 0.02$). Figure 2 displays the prevalence of prehypertension and hypertension by age, among subjects aged 18 years and older.

Among total hypertensive patients, 54.9% (56/102) were aware of the diagnosis, 28.43% were in treatment, and only 7.84% had controlled BP. Considering those who were aware

Table 1. Demographic and clinical characteristics of the study population, at the General Hospital of Huambo, Angola, 2015 (n = 265).

CHARACTERISTICS	
Age in years, median (range)	36 (18–91)
Female gender (%)	60
Hypertension prevalence (%)	38.5
Prehypertension prevalence (%)	30.2
Self-reported diabetes (%)	3.39
Smoking (%)	4.15
Awareness, treatment, and control[a]	
Awareness (%)	54.9
Treatment (%)	28.43
Control (%)	7.84
Medical therapy	
Renin–angiotensin–aldosterone system inhibitors	18
Diuretics (Thiazide/Furosemide)	18/4
Calcium channel antagonists	13
Acetylsalicylic acid/Beta-blocker	3/1

Note: [a]n = 102 total hypertensive patients.

of the diagnosis, 51.78% (29/56) were in treatment, and of these, only 27.6% had controlled BP (Table 1). The most commonly used treatment regimens included renin–angiotensin–aldosterone system inhibitors, alone, or in combination with diuretics and/or calcium channel antagonists. Lack of awareness about diagnosis was significantly higher in younger (≤37 years) than in older (68.42% vs. 39.76%; OR = 3.28, 95% CI: 1.13–9.49, P = 0.02), and in men than in women (59.38% vs. 38.57%; OR = 2.32; 95% CI: 0.99–5.46, P = 0.05). Table 2 displays the univariate analysis of factors associated with the prevalence of hypertension and lack of awareness of diagnosis among subjects aged 18 years and older.

In the sample, 3.39% and 4.15% self-reported diabetes and active smoking, respectively, without significant association with hypertension prevalence.

Discussion

Prevalence. The prevalence of hypertension found in this study (38.5%) is consistent with that of other studies in Africa, being 38.2% and 38.9% in Nigeria and South Africa, respectively.[21,22] However, it was relatively lesser than that found (45.2%) in the study done in the country's capital with workers from a university,[14] which can be explained mainly by the significant difference in age between the two studies (44.5 ± 10.6 years in the previous study vs. 38.67 ± 15.36 years in this study). Moreover, to a lesser extent, the social class difference may be another reason, by factors like higher access to industrialized food among workers compared with the population of the current study, most of them from lower social class and peri-urban area.

In this study, only 31.3% of the population had normal BP and 68.7% had high BP (prehypertension or hypertension). These data are relevant, considering the median age of the study, and the parallel knowledge that around 78.61% of

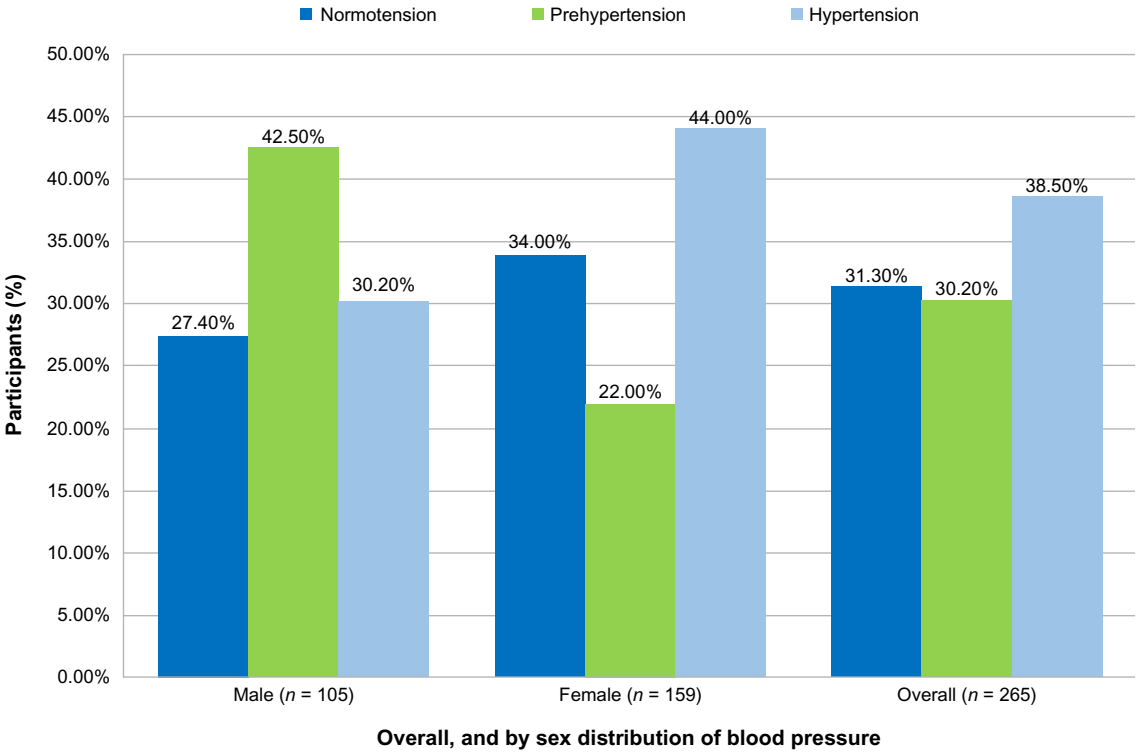

Figure 1. Overall and by gender BP distribution, in adults aged 18 years and older, at the General Hospital of Huambo, Angola, 2015 (n = 265).

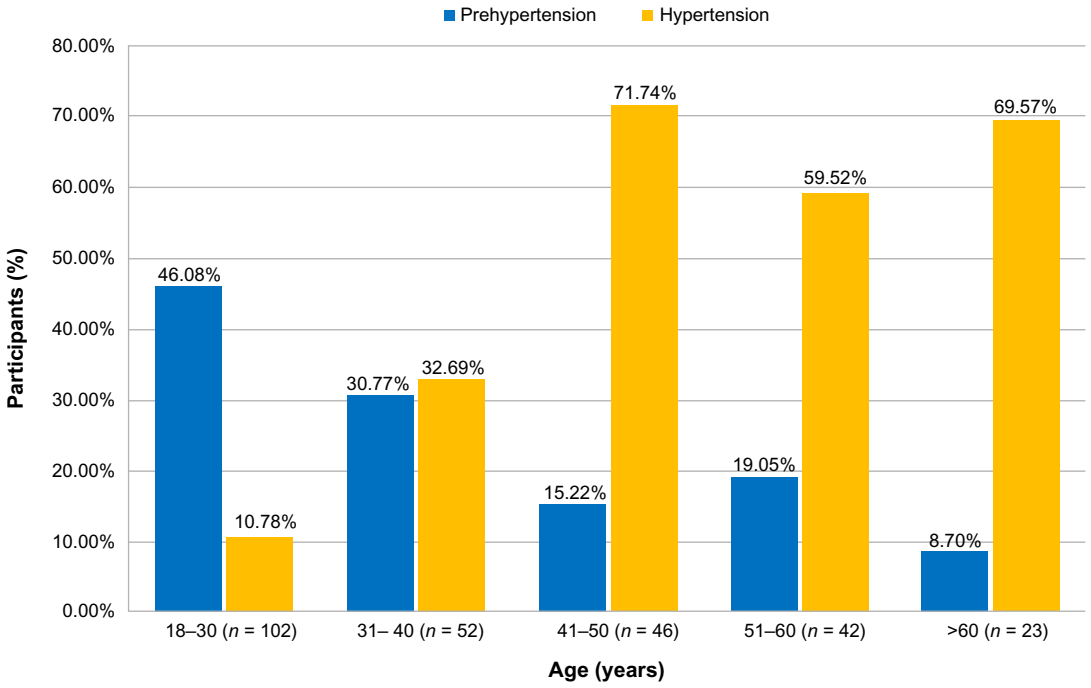

Figure 2. Prevalence of prehypertension and hypertension by age, in adults aged 18 years and older, at the General Hospital of Huambo, Angola, 2015 ($n = 265$).

prehypertensive patients can progress to hypertension within four to five years, if no intervention is implemented.[23] In this way, approximately 62.22% of the economically active population can become hypertensive within this period, which is a real alert for an imminent explosion of cardiovascular events, if no action is taken.

Associations. The prevalence increased with age, which corroborates with data from the literature.[24] The association with the female gender is also found in most of the literature,[25,26] which has been attributed to the higher prevalence of obesity in females.[27] Obesity may have also contributed to higher cardiovascular mortality observed in women in Sub-Saharan Africa from 1990 to 2013.[9] No significant association was found between hypertension and diabetes or smoking, most likely due to the low number of smokers and diabetics in the sample.

Awareness, treatment, and control. Only 54.9% of hypertensives were aware of their status until this study. A low awareness rate was also found in the study carried out in the north of the country[13] and was emphasized in most studies in this region.[28] The treatment rate was even lower so that among total hypertensives, only 28.43% (29 of 102 patients) were in treatment and 7.84% had controlled BP, which is in accordance with the rates found in other studies.[23,28] It is even more worrying when considering that this is a sample of patients with some contact with health professionals, and the problem may be greater in the general population, particularly from rural area, as found in Madagascar where only 1.7% and 5.3% of hypertensive patients were in treatment in rural and urban areas, respectively.[29] This scenery is favorable to the occurrence of TOD at an earlier age compared to the world average, as has been found by other studies.[16,30,31] In this study, it was impossible to screen for most TOD, due to resources limitations, and there are no previously reported data in this population. The only existing data are about peripheral arterial disease, whose prevalence was 42.6% among those aged 40 years and older, using the ankle-brachial index as diagnostic criteria, in a study carried out in parallel with this.[32] It is worth to highlight that in a study done in the country's capital with 123 patients aged ≤45 years (mean 36.62 ± 5.49 years), admitted with hypertensive emergencies, the most frequent presentations were hemorrhagic stroke (82.1%) and hypertensive encephalopathy (9.8%), with 25.2% inhospital mortality.[15] These data from the few available studies can be the closest reflection of the overall picture of CVD in the country. Additionally, even among those with previous diagnosis, only 51.78% was under treatment, and of these, only 27.6% had controlled

Table 2. Risk ratio of potential predisposing factors for hypertension and lack of awareness of diagnosis, in adults aged 18 years and older, at the General Hospital of Huambo, Angola, 2015 ($n = 265$).

FACTOR	*ODDS RATIO*	95% CI	*P*-VALUE
Prevalence of hypertension			
Sex (female vs. male)	1.81	1.08–3.05	0.02
Age (>35 vs. ≤35 years)	10.09	5.46–18.66	<0.01
Lack of awareness[a]			
Age (>37 vs. ≤37 years)	3.28	1.13–9.49	0.02
Sex (male vs. female)	2.32	0.99–5.46	0.05

Note: [a]$n = 102$ total hypertensive patients.
Abbreviation: CI, confidence interval.

BP. This raises concern about the need for training of health professionals on the importance of an appropriate approach to hypertension.[33] This includes diagnosis, treatment institution, adjustments of drug dosages to achieve the desired goals, and adherence check, knowing that the latter is the leading cause of noncontrol among those with established treatment, as found in adherence check study in Congo, where 54.2% were nonadherent and only 15.6% had controlled BP.[34,35]

Professional training is necessary, because even those with the diagnosis confirmed by a professional were likely to be released without treatment, reflecting a lack of preparedness of health system, at this level, for the care of hypertensive outpatients as found in Tanzania.[36] This may be occurring because of the little attention that is given to NCD, during training, in a medium where acute communicable diseases are still the leading cause of mortality.[12] However, it is worthy to emphasize that NCDs have shown increasing prevalence and growing space on morbidity and mortality.[12,15] Therefore, they should also be worthy of focus during training.

Another important element is that young people and men, although less affected, are the groups more unaware of the diagnosis, reaching 66.66% in young people and 59.37% in men. This has also been shown in other studies, where the unawareness rate ranged from 72% to 81.3%, and higher in younger.[24,37] This context of unawareness, favours the little implementation of lifestyle changes by most of them, as shown in relation to salt intake among university students in the capital,[38] and stay without pharmacologic treatment.[22] Even in treatment, these subgroups tend to have higher rates of nonadherence and low control.[22,24,25] This confluence of factors is the substrate for the occurrence of early cardiovascular events and premature mortality, as shown in other studies.[16,39]

Finally, analyzing in the setting of 25 × 25 global target, the results of this study are in line with a study of current trends, showing that Africa is the region of the world with greater difficulty to achieve this target.[40] Among the risk factors to address, hypertension is the factor whose reduction could cause the greatest impact to achieve this global target.[31,41] Therefore, the low awareness, treatment, and control are points to take into account in the planning, implementation, evaluation, and adjustment of strategies aimed to decrease these issues and achieve such target at the local level.

Conclusions

This is the first study on hypertension in Huambo. The study revealed a high prevalence, with low awareness, treatment, and control rates. Greater efforts and studies, with representative samples, are necessary to overcome these challenges and better understand about the disease and associated factors in this population.

Limitations

This is a single-center and hospital-based study; hence, it does not represent the general population of Huambo. The single measurement is another evident limitation of this study, an option that was chosen because resource limitations, at the local level, extend to the number of available monitors for BP measurement and the number of collaborators to carry out this research.

Abbreviations

BP: blood pressure
NCDs: noncommunicable diseases
TOD: target organ damage

Author Contributions

Conceived and designed the study: FCP, ABPC, AMP. Collected the data: ABC, ABPC, FCP. Analyzed the data: FCP. Wrote the first draft of the article: FCP. Made critical revisions: AMP, ABC. All the authors reviewed and approved the final article.

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