

## May Measurement Month 2018: an analysis of blood pressure screening results from Angola

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### KEYWORDS

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Elevated blood pressure (BP) is a growing burden worldwide with high prevalence in the world and with a huge impact on public health. May Measurement Month (MMM) is a global initiative aimed at raising awareness of high BP and to act as a temporary solution to the lack of screening programmes. An opportunistic cross-sectional survey of volunteers aged  $\geq 18$  was carried out in May 2018. Blood pressure measurement, the definition of hypertension and statistical analysis followed the standard MMM protocol. In Angola 14 433 individuals (mean age 38.6 years; 53.7% female; 99.9% black) in 6 of 18 provinces were screened. In total, 99.0% of screenees provided three BP readings with an average BP from 2nd and 3rd reading of 126/80 mmHg. After imputation, 4844 (33.6%) had hypertension of whom 54.2% were aware of their diagnosis and 46.3% were on antihypertensive medication. Of those medicated, 42.6% were controlled and of all hypertensive individuals, 19.7% were controlled. We screened 2603 individuals with untreated hypertension and 1285 with inadequately treated hypertension. Angolan MMM18 emerges as a continuation of the Angolan MMM17 study, the largest BP screening campaign undertaken in Angola, enabling us to compare the 2 years. This year's results also showed a high percentage of hypertensive individuals and almost 3900 adults with untreated or inadequately treated hypertension, demonstrating that there is still a long way to go but also that the Angolan MMM is being effective at raising awareness at least among these individuals.

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## Introduction

The World Health Organization identifies hypertension as the leading risk factor for cardiovascular disease. Characterized by systolic blood pressure (BP)  $\geq 140$  mmHg or diastolic BP  $\geq 90$  mmHg, early diagnosis enables its control with adequate medication, avoiding increased mortality rate or cardiovascular events such as myocardial infarction, cerebrovascular disease, and renal failure.<sup>1-3</sup>

If arterial hypertension was previously considered a disease of low prevalence in developing countries, evidence suggests that its impact today is very large mainly due to lower levels of awareness and control of hypertension, a younger age at onset, and a potentially more aggressive disease course seen.<sup>4</sup>

Angola is a country in sub-Saharan Africa with a growing population of 30 175 553 of which 14 830 298 (49.1%) are 18 years old or more (National Statistical Institute). In the 2017 May Measurement Month (MMM) study,<sup>4</sup> a global initiative of the International Society of Hypertension, Angola screened 17 481 individuals concluding that 34.5% had hypertension; of those not on antihypertensive medication, 26% had hypertension, and of those on treatment, almost 60% had uncontrolled BP, showing that an urgent action was required. As a pragmatic and rapid approach to addressing the problem of insufficient awareness of hypertension, MMM continued in Angola in 2018. The primary objective was to raise awareness of BP.

## Methods

This cross-sectional survey of volunteers aged  $\geq 18$  years was carried out in May 2018. Blood pressure measurement, the definition of hypertension and statistical analysis followed the standard MMM protocol. In Angola 6 of 18 provinces were screened. The most common types of screening sites were hospitals and clinics but also public places. Each participant had three seated BP measurements and the mean of the 2nd and 3rd readings was calculated. Blood pressure measurement was obtained by automatic Omron devices. Hypertension was defined as a systolic BP of at least 140 mmHg or a diastolic BP of at least 90 mmHg (or both). Participants receiving antihypertensive treatment were also assumed to have hypertension. Among those on treatment, controlled BP was defined as a BP of  $< 140/90$  mmHg. Submitted data from Angola were collated and analysed centrally by MMM project team using Stata version 14.2. Multiple imputation using chained equations based on the global data<sup>5</sup> were used to impute missing BP readings. Information on country income was sourced from the World Bank classification of economies.

## Results

A total of 14 433 individuals were screened in six provinces in Angola, with a mean age of 38.6 years ( $\pm 13.9$  years), being 53.7% female. In total, 15.5% (2241) of all the participants were taking antihypertensive therapy. In total, 3.2% (461) of the sample were diabetic, 1.0% (150) of the sample

had a previous acute myocardial infarction, 1.0% (150) of the sample had a previous stroke, 5.3% (761) were smokers, and 18.5% (2670) of the sample reported an alcohol consumption of once or more times per week. In total, 99.0% of screenees provided three BP readings with an average BP from the 2nd and 3rd reading of 126/80 mmHg.

From the 12 192 individuals not taking antihypertensive medication, 21.4% (2603) were hypertensive, and from the 2241 individuals taking hypertensive medications, 57.4% (1285) had uncontrolled BP.

After imputation and standardization for age and sex, the mean BP of the 2nd and 3rd readings was 127/80 mmHg. This was 136/86 mmHg amongst individuals on antihypertensive medication and 125/79 mmHg amongst individuals not on antihypertensive medication.

After multiple imputation, of the 14 433 individuals, 33.6% (4844) participants were hypertensive, of whom 54.2% (2627) were aware of their diagnosis and 46.3% were taking antihypertensive medication. In total, 42.6% of those on medication had controlled hypertension. Of the total number of hypertensive individuals, 19.7% were controlled.

After adjustment for age, sex, and antihypertensive treatment, systolic and diastolic BPs were significantly higher in those with antihypertensive medication (adjusted for age and sex only); a previous history of stroke; alcohol consumption regardless the amount; and in overweight/obese patients compared with patients who were on a normal weight. Diastolic BP readings were also significantly higher in individuals who were fasting. In contrast, pregnant women and those who were considered underweight (body mass index  $< 18.5$  kg/m<sup>2</sup>) had lower systolic and diastolic BP readings compared with women who were not pregnant and compared with participants who were of a normal weight.

## Discussion

MMM is the largest synchronized, standardized multinational screening campaign of any cardiovascular risk factor ever done worldwide and in Angola. Despite the lack of representativeness, age and sex standardization showed similar BPs between the Angolan MMM18 study and the Angolan MMM17 study,<sup>6</sup> providing important information on the extent of hypertension in Angola.

After imputation, the age- and-sex standardized mean BP of the 2nd and 3rd readings was 127/80 mmHg, which was very similar to the average of 126/78 mmHg calculated from Angolan MMM17 data. In 125/79 mmHg was the mean BP of individuals who did not receive antihypertensive treatment and 136/86 mmHg was the mean BP of the individuals taking antihypertensive medication, both values were lower than in Angolan MMM17 where these mean BP were 128/79 mmHg and 140/85 mmHg, respectively.

The data showed a similar percentage of hypertensive individuals in 2018 (33.6% in Angolan MMM18 and 34.5% in Angolan MMM17) but a lower percentage of hypertensive patients who were not taking medication (83.7% vs. 88.9%). From those who were not taking antihypertensive medication, 21.4% were hypertensive compared with

26.3% in Angolan MMM17. For those on antihypertensive medication, 57.4% had uncontrolled BP compared with 59.7% in Angolan MMM17.

When compared with the sub-Saharan Africa data collected in the 2018 MMM Global Screening,<sup>5</sup> Angolan MMM18 included a higher percentage of hypertensives (33.6% vs. 24.8%) but a similar percentage of controlled hypertensives on medication (42.6% vs. 45.1%). Participants in Angola have a higher percentage of hypertensive individuals: aware of their diagnosis (54.2% vs. 43.6%); on medication (46.3% vs. 33.1%); with controlled hypertension (19.7% vs. 15.0%). Despite the fact that there is still a long battle, the Angolan MMM may have contributed to raising awareness at least among these adults with untreated or inadequately treated hypertension.

Individuals with antihypertensive medication, previous history of stroke, alcohol intake, and overweight/obesity had significantly higher BP levels than those without. Conversely, pregnant women and individuals who were underweight had significantly lower BP, confirming the results of the Angolan MMM17 study and emphasizing the need for more assertive prevention programmes aiming at people with these risk factors.

The Angolan MMM18 study continues to show poor control rates among hypertensive adults emphasizing the need to continue raising awareness of such issues such as adherence to therapy. Whether poor BP control is due to lack of awareness of the condition or its severity, or being unable to afford the medication, or receiving poor medications, side effects of the medication, finding out the reasons are

very important to help find solutions that could improve the control of hypertension.

**Conflict of interest:** none declared.

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