

May Measurement Month 2019: an analysis of blood pressure screening results from Angola

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KEYWORDS

Hypertension;
Blood pressure;
Screening;
Angola;
Treatment;
Control

Raised blood pressure (BP) is the biggest risk factor that contributes to the global burden of disease and mortality. May Measurement Month (MMM) is a global initiative aimed to improved awareness of BP and has been a temporary solution to the lack of screening programmes. An opportunistic cross-sectional survey of volunteers aged ≥ 18 was carried out in May 2019. Blood pressure measurement, the definition of hypertension, and statistical analysis followed the standard MMM protocol. In total, 7112 individuals were screened (mean age 41.3 years; 50.4% female; 99.5% black) in 6 of the 18 Angolan provinces. In total, 99.6% of screenees provided three BP readings with an average BP of the 2nd and 3rd readings of 126/81 mmHg. After imputation, 2745 (38.6%) had hypertension of whom 1389 (59.8%) were aware of their diagnosis and 50.6% were on antihypertensive medication. Of those 1389 treated participants, 41.2% were controlled ($< 140/90$ mmHg) and of all hypertensive individuals, 20.8% were controlled. Also, 1356 individuals had untreated hypertension and 817 were inadequately treated. Angolan MMM19 follows on from the MMM17 ($n = 17481$) and MMM18 ($n = 14433$) studies, which were the largest BP screening campaigns undertaken in Angola. The 2019 results showed a high percentage of hypertensive individuals and almost 2200 adults had either untreated or inadequately treated hypertension, demonstrating that there is work to do but also that the Angolan MMM is being effective at raising awareness at least among these individuals.

Introduction

The World Health Organisation recognize hypertension as the leading risk factor for cardiovascular disease. Characterized by an untreated systolic blood pressure (BP) ≥ 140 mmHg or diastolic BP ≥ 90 mmHg or being on

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treatment for raised BP, early diagnosis enables its control with adequate medication, thereby avoiding the associated increased mortality rate and cardiovascular events.¹⁻³

Hypertension, once considered a disease of low prevalence in developing countries, today has high adverse impact due to lower levels of awareness and control, a younger age at onset, and a potentially more aggressive disease course.⁴

Angola is a country in sub-Saharan Africa with a growing population of 31 million of which 15 million (49%) are 18 years old or more (National Statistical Institute). In 2017 and 2018, Angola took part May Measurement Month (MMM),^{4,5} a global initiative of the International Society of Hypertension, and screened 17 481 and 14 433 individuals, respectively. In summary, of those screened, 34.5% in 2017 and 33.6% in 2018 had hypertension; of those not on antihypertensive medication, 26% (2017) and 21% (2018) had hypertension, and of those on treatment, 59.7% and 57.4% (respectively) had uncontrolled BP (systolic ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg), showing that urgent action is required. As a pragmatic and rapid approach to addressing the problem of insufficient awareness of hypertension, MMM continued in Angola in 2019. The primary objective was to raise awareness of BP at the population and individual level.

Methods

This cross-sectional survey of volunteers aged ≥ 18 years was carried out in May 2019. Blood pressure measurement, the definition of hypertension, and statistical analysis followed the standard MMM protocol.⁶ In Angola, we screened in 33 locations spread across 6 of 18 provinces with the help of 70 trained health student volunteers. The most common types of screening sites were hospitals, clinics, and public places. Each participant had three seated BP measurements and the mean of the 2nd and 3rd readings was used in analyses. Blood pressure measurement was carried out using automatic Omron devices. Hypertension was defined as a systolic BP ≥ 140 mmHg or a diastolic BP ≥ 90 mmHg (or both) or in participants receiving antihypertensive treatment. Among those on treatment, controlled BP was defined as a BP of $< 140/90$ mmHg. Data collection was done via Microsoft Excel and the MMM app. Submitted data from Angola were collated and analysed centrally by the MMM project team using Stata version 16.0. Multiple imputation using chained equations based on the global data were used to impute missing BP readings.⁶

Results

A total of 7112 individuals were screened with a mean age of 41.3 years, and 50.4% (3587) were female. Of all participants, 14.3% (1020) had never had their BP measured. In total, 19.5% (1389) of all the participants were taking antihypertensive therapy, 169 (2.4%) were using statins and 276 (3.9%) were using aspirin. Of all participants, 5.2% (373) were diabetic, 2.4% (172) had a previous acute

myocardial infarction, 1.7% (124) had a previous stroke, 6.6% (469) were smokers, 12.9% (919) reported an alcohol consumption of once or more times per week, and 39.7% (2827) were overweight/obese. Of women, 13.5% (484) reported a history of hypertension in a previous pregnancy.

In total, 99.6% of screenees provided three BP readings with an average BP from the 2nd and 3rd reading of 126/81 mmHg. After imputation and standardization for age and sex, the mean BP of the 2nd and 3rd readings was 126/80 mmHg. This was 137/87 mmHg amongst individuals on antihypertensive medication and 123/79 mmHg amongst individuals not on antihypertensive medication.

From the 5723 individuals not taking antihypertensive medication, 23.7% (1356) were hypertensive, and from the 1389 individuals taking hypertensive medications, 58.8% (817) had uncontrolled BP. Therefore, 2173 individuals had untreated or inadequately treated hypertension.

After multiple imputations, of the 7112 individuals, 38.6% (2745) were hypertensive, of whom 59.8% (1641) were aware of their diagnosis and 50.6% were taking antihypertensive medication. In total, 41.2% of those on medication had controlled hypertension. Of the total number of hypertensive individuals, 20.8% were controlled (Table 1).

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); known hypertension; previous hypertension in pregnancy; and in overweight/obese patients compared with patients who were on a healthy weight. Diastolic BP readings were also significantly higher in individuals who reported alcohol consumption more than rarely.

Discussion

May Measurement Month continues to be the largest synchronized, standardized multinational screening campaign of any cardiovascular risk factor ever done worldwide and in Angola. Despite the fact that it is not randomly sampled, and as a result is not nationally representative, age and sex standardization showed similar BPs between the Angolan MMM19 study and the Angolan MMM17 and MMM18 studies,^{7,8} 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 126/80 mmHg, which was very similar to the average of 126/78 and 127/80 mmHg calculated from the Angolan MMM17 and MMM18 data, respectively. The mean BP of individuals not on antihypertensive treatment was 123/79 and 137/87 mmHg was the mean BP of the individuals taking antihypertensive medication. Both values were slightly lower than in Angolan MMM17 (128/79 and 140/85 mmHg, respectively) and similar in MMM18 (125/79 and 136/86 mmHg, respectively).

In 2019, Angolan data show a higher percentage of hypertensive individuals (38.6%) when compared with 2017 (34.5%) and 2018 (33.6%) studies. These year results may

Table 1 Total participants and proportions with hypertension, awareness, on medication and with controlled blood pressure

Total participants	Number (%) with hypertension	Number (%) of hypertensives aware	Number (%) of hypertensives on medication	Number (%) of those on medication with controlled BP	Number (%) of all hypertensives with controlled BP
7112	2745 (38.6)	1641 (59.8)	1389 (50.6)	572 (41.2)	572 (20.8)

BP, blood pressure.

be explained by the fact that the screenings were carried out mainly in health-care facilities and had a smaller sample. Of those who were not taking antihypertensive medication, 23.7% were hypertensive compared with 26.3% in Angolan MMM17 and 21.4% in MMM18. Of those on antihypertensive medication, 58.8% had uncontrolled BP compared with 59.7% in Angolan MMM17 and 57.4% in Angolan MMM18. Also, 59.8% of hypertensives were aware of their diagnosis compared with 54.2% in Angolan MMM18 (no data in MMM17).

Compared with the MMM sub-Saharan Africa data (collected in the 2019 MMM Global Campaign)⁶ Angolan MMM19 reported a similar mean age (40.8 vs. 41.3 years, respectively) and mean BP (125/79 vs. 126/80 mmHg, respectively). Angolan MMM19 found a higher proportion of participants with hypertension (38.6% vs. 27.9%) and a lower percentage of controlled hypertensives on medication (41.2% vs. 50.7%), however, included a higher percentage of hypertensive individuals: aware of their diagnosis (59.8% vs. 42.7%); on antihypertensive medication (50.6% vs. 34.5%); and with controlled hypertension (20.8% vs. 17.0%). Despite the differences and after almost 40 000 individuals screened across the three campaigns, the Angolan MMM has contributed to raising awareness, at least among those adults identified with untreated or inadequately treated hypertension.

Individuals taking antihypertensive medication, known hypertension, previous hypertension in pregnancy, overweight/obesity, and more than rare alcohol consumption, had significantly higher BP levels compared with those not in these categories, confirming the results of the Global MMM19 study.⁶ This emphasizes the need for more assertive prevention programmes targeting these risk factors.

The Angolan MMM19 showed a high percentage of hypertensive patients, unaware hypertensive patients and poor control amongst those treated, highlighting the importance of continuing to raise awareness with the objective of preventing, detecting and treating the disease as early as possible, and also improving the monitoring of patients with existing hypertension to understand the high number with an uncontrolled BP.

Acknowledgements

The authors thank to all local investigators, volunteer staff, and participants.

Conflict of interest: none declared.

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