

May Measurement Month 2019: an analysis of blood pressure screening results from Benin-Sub-Saharan Africa

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Hypertension constitutes a major health concern worldwide and particularly in Sub-Saharan Africa. May Measurement Month (MMM) is a global initiative of the International Society of Hypertension for raising awareness of high blood pressure (BP). This work aims to determine the prevalence, awareness and levels of treatment and control of hypertension among adults participating in the MMM Campaign in Benin in 2019 (MMM19). A cross-sectional survey including volunteers aged ≥ 18 years was carried out in June 2019 in 13 rural and urban areas in Benin. BP measurement followed the MMM19 protocol. Hypertension was defined as a systolic BP ≥ 140 mmHg, or a diastolic BP ≥ 90 mmHg (based on the mean of the second and third readings) or taking antihypertensive medication. A total of 3637 people were screened with a female predominance (61.4%) and a mean age of 44.4 ± 16.1 years. A total of 1363 (37.5%) participants had hypertension. Of 1363 participants with hypertension: 64.5% were aware of their status and 43.9% were taking antihypertensive medication. Among 598 participants taking anti-hypertensive medication, 34.9% had controlled BP (systolic BP < 140 mmHg and diastolic BP < 90 mmHg). The results suggest a high prevalence of hypertension in Benin and that intensifying actions for its primary prevention, early detection and effective management should be encouraged.

Introduction

Hypertension constitutes a major health concern worldwide, contributing significantly to the global mortality.¹ Ageing and lifestyle modifications in Sub-Saharan Africa

have led to the growth of hypertension. The region is facing a high burden of cardiovascular disease such as stroke and heart failure.² For example, the prevalence of stroke was estimated at 1.2% in a sample of people aged 15 years and over in Benin in 2016.³

Hypertension affects 25.9% of Beninese adults according to a national survey conducted in 2015 by the ministry of

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health, using the World Health Organization stepwise methodology;⁴ about 68.2% had never had their blood pressure (BP) measured and more than half of people with raised BP were not aware of their status. Despite the availability of low-cost antihypertensive medications in Benin, data suggest that less than half of known hypertensive people were treated and less than one-third of them get their BPs controlled to currently recommended targets.⁴⁻⁶ Late diagnosis of hypertension and poor control of BP increase the frequency of hypertensive complications. Studies in Benin showed a high frequency of hypertensive patients with high cardiovascular risk or serious complications.^{7,8}

The reduction of burden attributed to hypertension can be achieved by increasing awareness through periodic large screening for raised BP. The first campaign of BP measurement following the protocol of 'May Measurement Month' (MMM) campaign was conducted in Benin in May 2018. It was co-ordinated by the International Society of Hypertension team and included 2035 participants.⁹

MMM was repeated in 2019 in Benin with an aim of raising awareness of high BP, and with secondary aims to determine prevalence, awareness and levels of treatment and control of hypertension among the adults screened.

Methods

The methods of the MMM study in 2019, have been described previously.¹⁰ MMM in Benin was co-ordinated by the Benin Cardiology Society (SBC). A local MMM19 committee was created and authorization for the campaign was obtained from Benin Ministry of Health.

The campaign was promoted nationally through classical and social media, churches, and town criers by the MMM committee. In each of the six regions of Benin (Atlantique-Littoral, Ouémé-Plateau, Zou-Collines, Atacora-Donga, Borgou-Alibori, and Mono-Couffo), one or two cardiologists were identified and were responsible for screening and recruiting volunteer staff to set up screening sites. A total of 13 sites were created in rural, semi-urban, and urban settings. About 80 volunteers were involved and were trained on the data collection. The screening sessions took place in June 2019, over 2 days per site, according to a pre-established schedule. After obtaining written informed consent from participants and completing an individual interview, height and weight were measured. Three BP measurements were then taken (with 1 min between readings) in the left arm, in the seated position, after 5 min of rest, using a validated electronic device (Model M3, OMRON®, Japan) with a suitable cuff (22-42 cm). The BP devices were provided by the MMM project team having been donated by OMRON Healthcare. BP levels were based on the mean of second and third readings. Hypertension was defined as a systolic BP ≥ 140 and/or diastolic BP ≥ 90 mmHg and/or on anti-hypertensive drug treatment, and controlled BP in treated hypertensive patients was defined as $< 140/90$ mmHg.

Data were filled out on hard copy of MMM19 forms and recorded on Microsoft Excel sheets. Data were analysed centrally by MMM project team and multiple imputation

performed to impute the mean of readings two and three where this was missing based on global data.¹⁰

Results

A total of 3637 participants were included with a female predominance (61.4%). The mean age was 44.4 ± 16.1 years. The mean body mass index was 25.4 ± 5.7 kg/m². Black people represented 97.0% of the sample. Histories of diabetes (3.6%), stroke (1.6%), and myocardial infarction (2.9%) were recorded. Use of aspirin and statin were self-reported by 2.7% and 0.5% of participants, respectively. About 2.6% of participants were smokers, 20.4% were alcohol drinkers (once or more per week) and 18.8% were obese.

Nearly a fifth (16.9%) of the participants had never had their BP checked. Mean systolic and diastolic BPs of untreated participants (age and sex standardized) were: 125.1 mmHg and 78.2 mmHg, respectively, whereas in treated hypertensives were: 144.9 mmHg and 90.5 mmHg, respectively.

Of 3637 participants, 1363 (37.5%) had hypertension. Of 1363 participants with hypertension: 64.5% were aware of their status and 43.9% were taking antihypertensive medication (Table 1). Among 598 participants taking antihypertensive medication, 209 (34.9%) had controlled BP ($< 140/90$ mmHg) (Table 1). Of those taking antihypertensive medication for whom the number of drug classes was known, 368 (79.5%) were taking only a single medication. Of all 1363 participants with hypertension, 15.3% were controlled.

In linear regression models adjusted for age, sex, and use of antihypertensive medications, systolic and diastolic BP were significantly higher in obese and overweight participants compared to those with healthy weight (see Supplementary material online, Figure S1), and higher in those drinking alcohol once or more per week compared to those drinking alcohol never or rarely (see Supplementary material online, Figure S2).

Systolic and diastolic BPs were significantly lower in pregnant women compared to non-pregnant women (see Supplementary material online, Figure S2) but were significantly higher in women with a history of hypertension in pregnancy compared to those without (see Supplementary material online, Figure S2).

Discussion

MMM19 is the largest BP measurement campaign to take place in Benin since the national STEPS survey conducted in 2015. Of the 3637 participants screened in Benin, more than a third had hypertension. Among those with hypertension, less than half were taking anti-hypertensive medication. About one in three treated hypertensive people had controlled BP.

The prevalence of hypertension (37.5%) is slightly higher than the global MMM19 result (34.0%). It was also higher than that observed during national STEPS survey in 2015 (25.9%).⁴ BP treatment and control levels in MMM19 Benin are lower than those reported for the global MMM19 results

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

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
3637	1363 (37.5)	879 (64.5)	598 (43.9)	209 (34.9)	209 (15.3)

but similar to recent data reported in Benin.^{4,6} The results reflect the magnitude of hypertension in Benin and underline the need for health promotion action. Early detection and effective management of hypertensive patients in peripheral health centres are necessary to limit the burden of hypertension in Benin. There is a need for training and support for primary healthcare personnel to be able to diagnose and manage hypertension. Telemedicine may be valuable in providing support for health centres lacking doctors. MMM19 also highlights the feasibility of data collection on BP through low-cost campaigns using standardized methodology and involving volunteers.

Screening in MMM19 was carried out opportunistically and as a result, findings are not necessarily representative of the whole adult Beninese population but can guide hypertension control actions. Participants in MMM19 may be more interested in their BP status compared to the general population and those with diagnosed hypertension may also be more interested in the management of their condition. These two factors allow us to hypothesize that the reality of hypertension awareness and BP control among hypertensive people in Benin are probably worse than suggested by the MMM19 results.

In summary, the results confirm a high proportion of participants with hypertension in Benin and suggest that actions should be implemented to improve its prevention, diagnosis, and effective management.

Supplementary material

[Supplementary material](#) is available at *European Heart Journal Supplements* online.

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