

# May Measurement Month 2018: an analyses of blood pressure screening results from Cabo Verde

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## KEYWORDS

Hypertension;  
Blood pressure;  
Screening;  
Cabo Verde;  
Treatment;  
Control

Raised blood pressure (BP) is the biggest contributor to mortality and disease burden in Cabo Verde. May Measurement Month (MMM) is a global campaign set up in 2017 to raise awareness of high BP. In 2018, we aimed to expand the campaign by including a greater number of centres to increase awareness. Nine islands participated in MMM 2018. Volunteers ( $\geq 18$  years) were recruited through opportunistic sampling at a variety of screening sites. Each participant had three BP measurements and completed a questionnaire on demographic, lifestyle, and environmental factors. Hypertension was defined as a systolic BP  $\geq 140$  mmHg and/or diastolic BP  $\geq 90$  mmHg, or taking antihypertensive medication. In total, 98.0% of screenees provided three BP readings and multiple imputation using chained equations was used to impute missing readings. A total of 8008 individuals (mean age 40.4 years; 68.5% female) were screened. After multiple imputation, 2666 (33.3%) individuals had hypertension, of whom 74.8% were aware of their previous diagnosis and 55.8% were taking antihypertensive medication. Of those on medication, 39.1% were controlled and of all hypertensives, 21.8% were controlled. We detected 44.2% of individuals with untreated hypertension and 60.9% of treated individuals were inadequately treated. The Cape Verdean population is ageing and consequently cardiovascular disease is increasing, with hypertension being an important risk factor. Corrective actions need to be taken by the government. MMM is an ideal initiative to reach the public by raising awareness of this major cardiovascular risk factor.

## Introduction

The Republic of Cabo Verde is an island country that consists of an archipelago of 10 main islands, several smaller islands, and islets, located 570 km off the coast of Senegal, Western Africa. The country covers an area of 4033 km<sup>2</sup> and is home to 544 081 inhabitants.<sup>1</sup> It is a medium-income developing country since 2008.<sup>2</sup> Health indicators are relatively positive in the Republic of Cabo Verde, compared

with other countries in Sub-Saharan Africa. In 2016, 6.6% of its Gross Domestic Product was spent on health. Life expectancy is 80 years for women and 71.8 years for men.<sup>3</sup> The infant mortality rate was 13 deaths per 1000 live births, whereas the maternal mortality rate is 18.8 deaths per 100 000 live births.<sup>4</sup> Cardiovascular disease (CVD) is the leading cause of morbidity and mortality and it is equally the major cause of evacuation to Portugal,<sup>4</sup> with whom we have cooperation protocols. In 2017, 35% of overall mortality was due to CVD, with cerebrovascular disease being the most frequent cause (35%).<sup>4</sup> Ischaemic heart disease already accounts for 18.3% of CVD mortality.<sup>4</sup> Considering

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that, 80% of stroke patients have hypertension,<sup>4</sup> demonstrating that hypertension constitutes a significant burden on CVD in the country. The May Measurement Month (MMM) initiative, led by the International Society of Hypertension (ISH), aims to raise awareness of the issues surrounding raised blood pressure (BP). The invitation to participate came from the African coordinator, which the College of Cardiology embraced. In MMM 2017, we had 2630 participants and the frequency of hypertension was 29%.<sup>5</sup> The data obtained in 2017 were promising and the national collaborators embraced the 2018 project aiming to achieve more participants and enhance the quality of the data collected compared with MMM 2017.

## Methods

The local study coordinators had the ethics authorization submitted and approved by the National Committee of Health Research and Ethics. A total of 9 islands and 28 centres, including hospitals, local health centres, and schools participated, with about 56 investigators and thousands of volunteer screeners. Investigator training was supported by the National Telemedicine Service and College of Cardiology with funding from the World Health Organization (WHO), the Ministry of Health and Social Security (MHSS), and the National Institute of Public Health. The volunteers were recruited via awareness and mobilization among hospitals and educational managers in health. The survey was conducted from May 1 to 31, using various types and brands of BP machines, with Omron being the most common. All BP measurements were taken with the participant seated. Questionnaires were completed, with weight and height also being measured. The majority of data collection was via an online application, with some data captured on spreadsheets. Local coordinators cleaned the data locally. Data were analysed centrally by the MMM project team and multiple imputation performed to impute the mean of readings 2 and 3 where data was missing using the global data.<sup>6</sup> The screening was publicized widely in the media, as well as with banners and posters. T-shirts were also made to better promote MMM across the country.

## Results

In a total of 8008 participants, 7851 had all the three BP readings, and the mean BP was 125.4/78.5 mmHg ([Supplementary material online, Table S1](#)). The mean age was 40.4 (SD 16.6) years, with 68.5% female and 31.3% males. The ethnicities of those surveyed were mostly mixed race (61.3%) and black (37.1%) ([Supplementary material online, Table S2](#)).

A total of 2666 (33.3%) had hypertension. Of those with hypertension, 74.8% were aware of their previous diagnosis, 55.8% were on antihypertensive treatment, and 39.1% of these had controlled BP. Of those not on antihypertensive medication, 18.1% had high BP.

Based on linear regression models, the global association between age and both systolic and diastolic BP in men and women who were not receiving antihypertensive

treatment showed a linear increase, with the mean BP in women exceeding the mean BP in men at 75 years of age ([Supplementary material online, Figure S1](#)). After adjustment for age and sex (including an interaction between age and sex) systolic and diastolic BPs were significantly higher in people who had previous hypertension diagnosis and were taking antihypertensive medications. Higher BPs were also seen in those who reported having a history of stroke (systolic and diastolic) and MI (diastolic only), compared to those without ([Supplementary material online, Figure S2](#)). Systolic and diastolic BPs were lower in pregnant women compared to women who were not pregnant. Higher BPs were seen in alcohol drinkers, smokers, and in those who were fasting at the time of screening ([Supplementary material online, Figure S3](#)). A strong linear relationship was seen between both systolic and diastolic BP and increasing levels of BMI ([Supplementary material online, Figure S4](#)).

## Discussion

MMM 2018 outgrew MMM 17<sup>5</sup> in Cabo Verde, with almost triple the number of participants. In MMM 18, we used mostly the online application for entering data, thus allowing better and more complete data. The proportion of hypertensives in our study was 33.3%, with 74.8% aware of a previous diagnosis of hypertension, 55.8% of these being treated, and 39.1% of those treated were properly controlled. For MMM 17, the proportion of hypertension was 29%, although based on a smaller sample of 2016 participants, with 11.1% being hypertensive and not treated, 89.9% being hypertensive with treatment and 43.1% of these non-controlled.<sup>5</sup> MMM 18 therefore reveals a higher number of hypertensives and a higher number being treated.

Cabo Verde data reveal a similar proportion of hypertensives compared with the global proportion of 33.4%, and higher than for Sub-Saharan Africa, reported to be 24.8%.<sup>6</sup> We found a substantial number of hypertensive patients treated, equal to the MMM 18 global figures, but with a smaller number of these well-controlled.<sup>6</sup> MMM can have a substantial impact in raising awareness in this group.

The data also revealed that the participants with previously diagnosed hypertension, or those taking antihypertensive medication, as well as those who had major CVD events such as stroke and MI had higher BP, compared to the baseline group. The Ministry of Health and Social Security initiative to create, in 2019, a national hypertension protocol which may help to improve the overall percentage of well-controlled patients.<sup>7</sup> This is particularly important as the Cape Verdean population is ageing and consequently CVD is increasing, with hypertension being an important risk factor. Actions need to be taken in line with the large studies carried out (IDNT 2007, MMM 2017).<sup>1,5</sup> This year's WHO STEPWISE approach study will bring more information about hypertension and CVD in our country. MMM will always be a critical initiative to reach the public and raise awareness to this major burden of hypertension.

## Supplementary material

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

## Acknowledgements

The authors thank Ministry of Health and Social Security (MHSS), World Health Organization (WHO), National Public Health Institute (INSP), National Centre of Telemedicine (NCT), Cabo Verde College of Cardiology, Cabo Verde Medical Association, National Telemedicine Service, Cape Verde University—UniCV, and University Jean Piaget—Cabo Verde.

## Funding

This work was supported by the Ministry of Health and Social Security (MHSS); World Health Organization (WHO); National Public Health Institute (INSP); and International Society of Hypertension (ISH).

**Conflict of interest:** none declared.

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