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May Measurement Month 2021: an analysis of blood pressure screening results from South Africa

Angela J. Woodiwiss[1]*, Ane Orchard[2], Catharina M.C. Mels[3,4], Aletta S. Uys[3,4], Benedicta N. Nkeh-Chungag[5], Andrea Kolkenbeck-Ruh[1,6], Lisa J. Ware[6], Winnie Mahlangu[7], Sarusha Pillay[8], Erika S.W. Jones[9], Vernice R. Peterson[1], Thomas Beaney[10,11], Sara Ahmadi-Abhari[12], and Neil R. Poulter[10]

[1]Cardiovascular Pathophysiology and Genomics Research Unit, School of Physiology, Faculty of Health Sciences, University of the Witwatersrand, 7 York Road, Parktown, Johannesburg, 2193, South Africa; [2]Clinical Pharmacy Division, Department of Pharmacy and Pharmacology, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa; [3]Hypertension in Africa Research Team (HART), Faculty of Health Sciences, North-West University, Potchefstroom, South Africa; [4]SAMRC Research Unit for Hypertension and Cardiovascular Disease, Faculty of Health Sciences, North-West University, Potchefstroom, South Africa; [5]Department of Biological and Environmental Sciences, Faculty of Natural Science, Walter Sisulu University, Mthatha, South Africa; [6]SAMRC-Wits Developmental Pathways to Health Research Unit, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa; [7]Home of Solace, Vosloorus, South Africa; [8]Department of Internal Medicine, King Edward VIII Hospital, Durban, South Africa; [9]Division of Nephrology and Hypertension, University of Cape Town, Cape Town, South Africa; [10]Imperial Clinical Trials Unit, Imperial College London, Stadium House, 68 Wood Lane, London W12 7RH, UK; [11]Department of Primary Care and Public Health, Imperial College London, St Dunstan's Road, London W6 8RP, UK; and [12]Department of Epidemiology and Biostatistics, School of Public Health, Imperial College London, London, UK

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Elevated blood pressure (BP) is a growing burden worldwide, leading to over 10 million deaths each year. In Sub-Saharan Africa, hypertension prevalence is higher and cardiovascular events occur at a younger age than in Europe or America. May Measurement Month (MMM) is a global campaign initiated by the International Society of Hypertension (ISH) aimed at raising awareness of high BP. In South Africa, the MMM campaign in 2017, 2018, and 2019 revealed that approximately one-third of adults had hypertension, only half of hypertensives were receiving antihypertensive therapy, and only a third of those with hypertension had controlled BP. These data highlight the need for continued BP screening and awareness campaigns in South Africa.

From May to November 2021, a cross-sectional survey of volunteers aged ≥18 years was performed. Blood pressure measurements, definition of hypertension, and statistical analyses followed the MMM protocol. The screening sites targeted the general population mainly on university campuses and pharmacies in preference to hospitals and clinics, aiming to raise awareness and allow access to screening in those less likely to be aware of their BP status. Of the 2294 individuals (age 37.3 ± 16.9 years) screened, 30.8% had hypertension. Of those with hypertension, only 48.6% were aware and 43.5% were receiving treatment for hypertension. A large proportion (50.4%) of

*Corresponding author. Tel: +27 11 717 2363, Email: angela.woodiwiss@wits.ac.za

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individuals receiving antihypertensive medication had uncontrolled BP (≥140/90 mmHg). In conclusion, the high prevalence of hypertension, despite the young adult age, and the high proportions of individuals unaware of their hypertension and with uncontrolled BP underscore the necessity for hypertension awareness campaigns and more rigorous management of hypertension.

Introduction

Cardiovascular disease (CVD) is the leading cause of death globally, resulting in an estimated 17 million deaths annually.[1] Within South Africa, one in six deaths are from CVD.[2] Although several well-established risk factors account for CVD, hypertension is the single risk factor that explains most population attributable CVD risk.[3] According to the World Health Organization (WHO), the prevalence of hypertension is higher in Africa (46% of individuals aged >25 years) and lower proportions achieve blood pressure (BP) control (<140/90 mmHg) compared to other regions in the world.[4,5] Furthermore, cardiovascular events occur at a younger age in Sub-Saharan Africans compared to other populations.[4,6] Consequently, campaigns to increase hypertension awareness and BP control are paramount in Sub-Saharan Africa. Hence, in 2017, when the May Measurement Month (MMM) initiative, which aims to raise awareness of raised BP, was instituted globally, South Africa became involved.[7] As with other countries globally, COVID-19 resulted in a halt to MMM activities in 2020. However, MMM was continued in 2021, the results of which are presented in this paper.

Methods

Study group

The study was approved by the Ethics Committees for each site (see online Supplementary material). Participants gave written informed consent. In total, 2294 participants (≥18 years of age) who volunteered to take part in the study were screened at various sites (see online Supplementary material).

Blood pressure, demographic, and anthropometric measurements

Blood pressure was measured three times as previously described,[7,8] and a questionnaire was used to collect limited clinical and demographic data[9] (see online Supplementary material).

Data analysis

Hypertension was defined as systolic BP ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg, based on the mean of the second and third of the three readings, or those on antihypertensive medication. Uncontrolled BP was defined as those on antihypertensive medication with BP ≥ 140/90 mmHg, and BP control as BP < 140/90 mmHg. In cases where any participant did not have all three BP readings, multiple imputation was used to estimate the mean of the second and third readings, based on global data, and as described previously.[9] Linear regression models were used to examine associations of raised BP with participant factors. The data were analysed centrally by the MMM project team[9] (see online Supplementary material).

Results

The general characteristics of the 2294 participants screened are shown in Supplementary material online, *Table S1*. The majority was young (42.3% < 30 years, 11.6% ≥ 60 years) with overall mean (SD) age 37.3 (16.9) years, approximately two-thirds (63%) were female, and they were predominantly of Black or White ethnicity. The proportions with diabetes, previous myocardial infarction, or stroke were low, as were the percentages using aspirin or statins. In addition, 50% of participants weighed more than 70 kg. However, over 50% met the WHO physical activity guidelines of at least 150 min of moderate exercise or 75 min of more vigorous exercise per week. Only 8.3% reported having a previous positive COVID-19 test, and only 17.9% had received at least one COVID-19 vaccination. Only 5.9% had previously participated in an MMM campaign.

Almost a third of the participants (30.8%) were hypertensive (*Table 1*). Of the 706 participants with hypertension, 43.5% were taking antihypertensive medication (*Table 1*), although only 37.3% of all participants answered the question of whether they receive medication for hypertension. Less than half of those with hypertension were aware of their condition and approximately half of treated hypertensives had controlled BP (<140/90 mmHg) (*Table 1*). The majority of participants with hypertension was being treated with one (45.9%) or two (31.3%) classes of agents (see Supplementary material online, *Table S1*). More men than women were hypertensive (*Table 2*), but the proportions of men aware of their condition, receiving treatment and having controlled BP were lower than that in women (*Table 2*).

Based on a linear regression model in those who were not receiving antihypertensive medication, age-related changes in BP were noted (see Supplementary material online, *Figure S1*). Age-related increases in systolic BP were noted with women having similar levels to men from age of 75 years. Age-related increases in diastolic BP (DBP) were noted up to about 60 years of age, after which DBP declined, and this decline was more rapid in women than in men (see Supplementary material online, *Figure S1*). Participants with known hypertension or those reporting the use of antihypertensive medication had higher BP (see Supplementary material online, *Figure S2*). Blood pressure did not differ significantly according to lifestyle risk factors (regular alcohol intake, smoking, physical activity, education level) (see Supplementary material online, *Figure S3*). Those women who were

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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
2294	706 (30.8%)	343 (48.6%)	307 (43.5%)	152 (49.6%)	152 (21.5%)

Table 2 Male vs. female participants and proportions with hypertension, awareness, on medication, and with controlled blood pressure (for six participants the sex was unknown)

Sex	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
Female	1445	400 (27.7%)	216 (54.0%)	198 (49.5%)	109 (54.9%)	109 (27.2%)
Male	843	304 (36.1%)	126 (41.4%)	108 (35.5%)	43 (39.4%)	43 (14.0%)

currently pregnant had lower BP (see Supplementary material online, *Figure S4*). Previous COVID-19 tests or vaccinations had no statistically significant association with BP level (see Supplementary material online, *Figure S5*).

Discussion

In South Africa, MMM revealed that in 2021 approximately a third of those screened were hypertensive despite a young mean age. However, less than half of hypertensives were aware of their condition (despite 58.5% having measured their BP within the last 12 months), and less than half were being treated. Moreover, of those that were treated, only half achieved BP control (<140/90 mmHg). More men than women had hypertension; but awareness, treatment, and BP control were lower in men than in women. These percentages were similar to data obtained in 2017,[7] 2018,[8] and 2019.[10] The number of participants screened was lower than in 2019,[10] possibly due to an avoidance of group gatherings subsequent to the COVID-19 pandemic. Importantly, however, the proportions from the different ethnic groups reflect the demographics of South Africa.

Of concern is the continued high prevalence of hypertension despite the relatively young age of the adult population, as shown in previous MMM campaigns in South Africa.[7,8,10] In addition, the low levels of awareness and treatment, similar to those previously reported,[7,8,10] highlight the need for ongoing screening and education programmes especially amongst young adults. Such campaigns are essential in South Africa given that the majority ethnic group is black African and that this ethnic group has a higher prevalence of hypertension[4,5] and cardiovascular events occur at a mean age that is 20 years lower than in European populations.[4,6]

A limitation of the MMM21 screening campaign was the poor response rate to the question regarding the use of antihypertensive medication. Hence, the data on the use of anti-hypertensives and BP control must be interpreted with caution, and true rates of treated hypertensives may be higher than those reported. The low numbers of individuals with previous cardiovascular events or diabetes preclude meaningful analyses of the relationships between co-morbidities and mean BP levels. Similarly, the lack of impact of lifestyle risk factors on BP may be attributed to the low proportions of participants with lifestyle risk factors. Due to the screening on only one occasion, there is a possibility of false positive diagnosis of hypertension.

In conclusion, as with MMM17, MMM18, and MMM19, the results of the present study highlight the need to improve hypertension awareness and education; but moreover, they emphasize the urgency to institute strategies to improve BP control in hypertensive individuals. Special attention should be given to young adults and men.

Supplementary material

Supplementary material is available at *European Heart Journal Supplements* online.

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Conflict of interest: none declared.

Data availability

The data underlying this article will be shared on reasonable request to the corresponding author.

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