

# May Measurement Month 2021: an analysis of blood pressure screening results from Zimbabwe

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## KEYWORDS

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The May Measurement Month 2021 campaign in Zimbabwe was aimed at assessing the frequency of hypertension and improving awareness among the population of the sequelae of elevated blood pressure (BP). Participants aged 18 years and above were recruited at outdoor booths to fill out a questionnaire and provide three BP measurements with 1-min intervals. Of the 2094 participants, over one-third (37.3%) were hypertensive, half of hypertensives (49.7%) were aware they had elevated pressure, and less than half (45.0%) of the hypertensive patients were on antihypertensive medications. Increasing age was directly proportional to hypertension with a large leap from 9.5 to 27.7% between the 18–29 and 30–39 age groups. Hypertension remains a major public health challenge in Zimbabwe. Improving access to preventive health screening services as well as treatment facilities is essential to early detect and control hypertension.

## Introduction

Hypertension poses an increasingly significant public health concern in Zimbabwe as the burden of disease shifts from communicable to non-communicable diseases.<sup>1</sup> A recent meta-analysis determined a pooled national prevalence of hypertension of 30%.<sup>2</sup> However, an urban study assessing adults in the general population aged 25 years and older showed a 41 and 26% hypertension prevalence in women and men, respectively.<sup>3</sup> In contrast, a mixed rural/urban study analysed outpatients aged 21 and older and revealed the following hypertension data: 69.7% prevalence, 56.2% awareness, 59.8% treatment adherence, 22% control on treatment, and a 20.7% complication rate of hypertension largely consisting of congestive heart failure, visual

defects, and stroke.<sup>4</sup> Cardiometabolic disease including hypertension and its sequelae account for ~8% of all-cause mortality in Zimbabwe.<sup>5</sup> Stroke is the most well-characterized complication of hypertension in the country. In a multi-center study, ~60% of all patients admitted for stroke had comorbid hypertension and 24.9% of all stroke patients died during hospitalization.<sup>6</sup> Given the significant morbidity and mortality of hypertension and its sequelae, an annual blood pressure (BP) survey was conducted in 2021 as part of the May Measurement Month (MMM) campaign to assess the frequency and awareness of hypertension in Zimbabwe.<sup>7</sup> In this paper, we report on the findings from the MMM 2021 (MMM21) campaign

## Methods

May Measurement Month is a global cross-sectional BP survey of volunteer adults (≥18 years) initiated by the International Society

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of Hypertension (ISH). J.C. and R.G. were the coordinators for the Zimbabwean section of the 2021 survey. Ethical clearance was received from the University of Zimbabwe, the National University of Science and Technology, and the Medical Research Council of Zimbabwe institutional review boards.

Workplaces, pharmacy stores, indoor, and outdoor public areas in the two largest cities in the country (Harare and Bulawayo) were chosen as the sites for data collection. Each site was assigned a team of volunteer nurse aides and medical clerkship students who were directly supervised by one of the study coordinators. Each team set up a booth with flyers inviting passers-by to have their BP checked. Blood pressure was measured using Omron automated sphygmomanometers. All participants were seated in a chair with a backrest and asked to rest their feet on the ground with their legs uncrossed. Adequate cuff size was selected for each individual participant to match their arm circumference. The cuff was placed on the brachium at heart level with the arm resting on a table, and three BP and heart rate readings were obtained and recorded with 1-min intervals between collections. Hypertension was defined as being on treatment for hypertension or a systolic BP  $\geq$  140 mmHg and/or a diastolic BP  $\geq$  90 mmHg based on the mean of the second and third of the three readings collected.

A questionnaire was administered to all participants to assess the following variables: ethnicity, participation in prior MMM surveys, level of education, prior COVID-19 infections, COVID-19 vaccination status, BP treatment status, impact of COVID-19 pandemic on BP treatment, concurrent aspirin and/or statin use, smoking status, alcohol use, prior myocardial infarction, prior stroke, diabetes status, prior use of hormone replacement therapy, pregnancy status, hypertension in prior pregnancies, weight, level of activity, and mode of payment for health consultation services. Data were manually recorded on anonymized collection sheets and then uploaded to the central MMM database via the MMM desktop application. Data analysis was performed by the MMM project team. Multiple imputations were performed to impute the mean of readings 2 and 3 where they were missing, based on the global data, as described previously.<sup>7</sup>

## Results

Of the 2094 total participants, the mean age was  $41.6 \pm 13.4$  years, and 1173 (56.0%) were female. Most participants (1937; 92.5%) self-identified as Black African, 5 (0.2%) were mixed race, and 152 (7.3%) had an unknown ethnicity. Aspirin use was reported by 383 (18.3%) participants, and 5 (0.2%) reported being on statin therapy. Only 331 (15.8%) had confirmed prior COVID-19 infections, while 1490 (71.2%) had received at least one COVID-19 vaccination. Diabetes was reported by 152 (7.3%) participants, 12 (0.6%) had a prior heart attack, and 11 (0.5%) participants reported a prior stroke. A fifth (21.3%) of participants had never had their BP measured.

After imputation, 782 (37.3%) participants were hypertensive, and of the hypertensive patients, 389

(49.7%) were aware and 352 (45.0%) were on antihypertensive treatment. Of the treated patients, 202 (57.4%) had achieved BP control defined as systolic  $<$  140 mmHg and diastolic  $<$  90 mmHg ([Table 1](#)). A linear increase in hypertension prevalence with increasing age for all participants was noted: 9.5% (18-29 years), 27.7% (30-39 years), 43.3% (40-49 years), 58.7% (50-59 years), 64.4% (60-69 years), and 65.0% (70 years or more).

## Discussion

Approximately one-third (37.3%) of all participants in the MMM21 campaign were found to have hypertension, and of these individuals, only half (49.7%) were aware of their hypertensive status. Less than half of the hypertensive patients (45.0%) were on BP-lowering treatment, and more than half of the treated patients (57.4%) achieved adequate BP control defined as systolic  $<$ 140 mmHg and diastolic  $<$ 90 mmHg. A meta-analysis of prior national surveys had reported in 2015 a hypertension prevalence of 30% for the general adult population compared with the 37.3% prevalence noted in the MMM21 campaign.<sup>2</sup> These differences may be related to the method of recruitment, with MMM21 utilizing convenience sampling, and so results may not be nationally representative. Of note, the MMM21 participants were less likely to be aware of their hypertensive status (49.7% vs. 56.2%), and fewer were already on BP-lowering medication (45.0% vs. 78.1%) compared to their outpatient counterparts in the Mazowe study.<sup>4</sup> The increased awareness and treatment administration in the Mazowe study are likely secondary to earlier detection and initiation of antihypertensives during routine assessments at prior outpatient visits for other medical comorbidities other than hypertension. Thus, the contrast between MMM21 and the Mazowe study may be a result of more frequent interactions with the health care system such as routine wellness check-ups or sick visits unrelated to hypertension, which are pivotal for early recognition and treatment of hypertension. However, local medical insurance companies currently do not provide coverage for routine wellness check-up visits. Enactment of robust preventive health policy mandating coverage of annual preventive health visits by medical insurers would serve as a pivotal step away from the current reactionary approach to hypertension management to a more proactive model. Based on MMM21 data, initiating annual BP screening at 30 years of age would be the most prudent cut-off as the prevalence of hypertension rises sharply from 9.5% in the 18-29 age group to 27.7% in the 30-39 age group. Furthermore, better BP control was noted in younger patients (see [Supplementary material online, Table S1](#)), which supports earlier screening aligning with the recommendations of

**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
2094	37.3	49.7	45.0	57.4	25.8

the 2020 guidelines of the ISH.<sup>8</sup> This preventive model will reduce morbidity and mortality from sequelae of hypertension such as strokes and heart attacks through earlier detection and better control of hypertension.

Despite taking place during the COVID-19 pandemic, 2094 participants were surveyed during MMM21, second only in size to the WHO STEPS survey, which enrolled 3003 participants. The large recruitment was possible due to the preceding nationwide COVID-19 vaccination programme that facilitated partial reopening of the country before the survey commenced. However, due to a surge in COVID-19 infections, the medical clerkship volunteers had to be recalled from the team because the medical schools were temporarily closed. Absence of rural sites was a limitation of the study leading to sampling bias by exclusion of rural participants.

## Conclusions

Overall, the MMM21 campaign showed that nearly one in every three adults screened were hypertensive, potentially reflecting a major public health concern in Zimbabwe. Implementation of public health policy that increases access to preventive health care is the next step required for early detection and control of elevated BP to decrease morbidity and mortality from the sequelae of hypertension.

## Supplementary material

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

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## Data availability

Data available on request.

## References

1. Hakim JG, Mujuru N, Rusakaniko S, Gomo ZAR. *Zimbabwe National survey on non-communicable disease risk factors - (ZINCoDs) Preliminary report using the WHO STEPwise approach to surveillance of non-communicable diseases (STEPS)*. Ministry of Health & Child Welfare; 2005.
2. Mutowo MP, Mangwiro JC, Lorgelly P, Owen A, Renzaho AMN. Hypertension in Zimbabwe: a meta-analysis to quantify its burden and policy implications. *World J Meta-anal* 2015;3:54-60.
3. Mufunda J, Scott LJ, Chifamba J, Matenga J, Sparks B, Cooper R *et al*. Correlates of blood pressure in an urban Zimbabwean population and comparison to other populations of African origin. *J Hum Hypertens* 2000;14:65-73.
4. Mungati M, Managazira P, Takundwa L, Gombe NT, Rusakaniko S, Tshimanga M. Factors affecting diagnosis and treatment of hypertension in Mazowe District of Mashonaland Central Province in Zimbabwe: 2012. *BMC Cardiovasc Disord* 2014;14:102.
5. Mutowo MP, Owen AJ, Baki B, Lorgelly PK, Gumbi KE, Mangwiro JC *et al*. Burden attributable to cardiometabolic diseases in Zimbabwe: a retrospective cross-sectional study of national mortality data. *BMC Public Health* 2015;15:1213.
6. Kaseke F, Stewart A, Gwanzura L, Hakim J, Chikwasha V. Clinical characteristics and outcomes of patients with stroke admitted to three tertiary hospitals in Zimbabwe: a retrospective one-year study. *Malawi Med. J* 2017;29:177-182.
7. Beaney T, Wang W, Schlaich MP, Schutte AE, Stergiou GS, Alcocer L *et al*. Global blood pressure screening during the COVID-19 pandemic: results from the May Measurement Month 2021 campaign. *J. Hypertens.* 2023;41:1446-1455.
8. Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D *et al*. 2020 International Society of Hypertension global hypertension practice guidelines. *Hypertension* 2020;75:1334-1357.