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

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Elevated blood pressure (BP) is the leading cause of global mortality, but control rates remain poor because most patients, especially in Africa, are unaware. May Measurement Month (MMM) is an annual global BP screening campaign that was initiated by the International Society of Hypertension (ISH) in 2017 to raise awareness of raised BP. Following participation in 2017 and 2018, Kenya participated again in 2019 and the results are reported here. Screening was carried out in 30 sites by volunteers coordinated by the Kenya Cardiac Society. Participants had three BP readings by standard methods with the last two being averaged and recorded. Heart rate, weight, height, socio-demographic parameters, and co-morbidities were documented. Hypertension was defined as a systolic BP (SBP) ≥140 mmHg and/or a diastolic BP (DBP) ≥90 mmHg or being on treatment with at least one antihypertensive medication. A total of 33,992 participants were screened, mean age was 42.5 (SD 16.8) years and 58.7% of participants were female. Only 27.3% had their BPs checked within the preceding 12 months. After multiple imputation, 26.1% were hypertensive, of whom 34.5% were aware of their hypertension and 31.5% were on treatment. Of those on treatment, 59.7% were controlled translating to 18.8% of all hypertensives. Being on treatment for hypertension, overweight, obese or having had hypertension in previous pregnancy were associated with increased SBP and DBP, while diabetes was associated with raised SBP. Two-thirds of hypertensives were unaware. Only a third of those aware were on treatment, with about 60% of these controlled. Lack of awareness remains a significant barrier to BP control. Programmes to raise awareness such as MMM are significant in raising population awareness.

Introduction

Hypertension is the most important risk factor for cardiovascular mortality and disability-adjusted life years globally. Africa has the highest age-standardized prevalence of hypertension estimated at 46% in individuals above 25 years.
old. Despite this rising burden in Sub-Saharan Africa, where healthcare systems are fragile; awareness, treatment, and control rates remain low at 27%, 18%, and 7%, respectively as reported in a recent meta-analysis. In Kenya, a nationally representative population-based survey in 2015 showed that 56% of the respondents had never had their blood pressure (BP) checked yet a third of deaths in the country are due to non-communicable diseases (NCDs) with cardiovascular disease contributing to the largest share (59%). The survey reported an age-standardized prevalence for hypertension of 24.5%, of whom 15.6% were aware, 26.9% of those aware were on treatment, and only 51.7% of those on treatment were controlled. Kenya has been participating in May Measurement Month (MMM), an annual global campaign initiated by the ISH to increase hypertension awareness, since 2017. Following the success of the campaign in 2017 and 2018, we once again participated in 2019 and the findings are reported here.

### Methods

Screening was co-ordinated by the Kenya Cardiac Society (KCS) on consenting adults at 30 sites across 13 counties in May and June 2019. Sites were selected based on availability of volunteers. Training material to the field staff for purposes of standardization of BP measurement were provided by ISH via the MMM website. Ethical approvals to conduct the study were obtained from both Kenyatta National Hospital (KNH) and Moi Teaching and Referral Hospital (MTRH) institutional review boards. Screening was conducted at health facilities, market places, prisons, urban centres, religious institutions, and learning institutions. The campaign was publicized through radio, social media, and locally using promotional materials such as T-shirts, poster, and pull-up banners. Calibrated Omron M3 digital BP devices provided by ISH were distributed to participating sites. Three BP readings taken 1 min apart with the participant seated quietly were recorded, along with the pulse rate, demographics, medical history, screening location, and self-reported awareness of hypertension status. Height and weight were also recorded where possible or estimated. The data were entered either directly into the Excel spreadsheet, the MMM mobile application, or paper forms that were then inputted into an Excel document. Hypertension was defined as a systolic BP (SBP) ≥140 mmHg and/or a diastolic BP (DBP) ≥90 mmHg (based on the mean of the second and third readings) or being on treatment with at least one antihypertensive medication. Controlled BP was defined as an SBP of <140 mmHg and a DBP <90 mmHg among those on antihypertensive medication. Participants with uncontrolled or untreated hypertension received oral and/or written information on appropriate lifestyle modification measures and linked to relevant clinics for further care. Paper data forms were cleaned locally by the KCS MMM coordinators before being loaded onto the MMM central database for analysis. Analysis was carried out centrally by the MMM project team with multiple imputations to correct for missing BP data based on global data.

### Results

The Kenyan sites screened 33,992 participants with a mean age of 42.5 (SD 16.8) years, 19,954 (58.7%) were females. Of the 65.7% with recorded ethnicity, 99.3% were Black Africans. Among the females, 566 (2.8%) were pregnant and 416 (2.1%) had self-reported history of hypertension in a previous pregnancy. A total of 1020 (3.0%) had a history of diabetes, 221 (0.7%) myocardial infarction, and 1117 (3.5%) stroke. A total of 2790 (8.2%) were taking antihypertension medications, 574 (1.7%), 755 (2.2%), and 291 (0.9%) were on one, two, and three medication classes, respectively. Only a minority, 326 (1.0%) and 439 (1.3%) were on a statin and aspirin, respectively. A total of 1083 participants (3.2%) were active smokers and 2086 (6.1%) drank alcohol at least once a week. A total of 6074 (17.9%) were overweight and 2922 (8.6%) obese. Their mean body mass index was 25.7 kg/m² (SD 5.0). After multiple imputation, 8870 (26.1%) were hypertensive, of whom 34.5% were aware and 31.5% were taking antihypertensive medicine. Of those on treatment, 59.7% were controlled giving an overall control rate for all hypertensives of 18.8% (Table 1). Age- and sex-adjusted SBP and DBP were higher in participants on antihypertensive medication. After adjustment for sex, age, and antihypertensive treatment, diabetes was associated with increased SBP, while overweight, obesity, and hypertension in previous pregnancy were associated with increased SBP and DBP.

### Discussion

Following Kenya’s participation in MMM in the years 2017 and 2018, we once again participated in MMM 2019 where 33,992 subjects were screened. The proportion with hypertension was 26.1%, of whom 34.5% were aware with 31.5% on antihypertensive treatment. Of those on treatment, 59.7% were controlled, with the overall control rate amongst hypertensives being 18.8%. The proportion of 26.1% with hypertension is similar to the MMM 2017 findings and a nationally representative survey, but higher than in MMM 2018. The data are also consistent with the findings of the Healthy Heart Africa (HHA) programme that screened close to 6 million participants (unpublished data). Whilst there was a trend towards improvement in awareness, treatment, and control rates, these parameters remain poor. As to whether this was due to recent concerted efforts in NCD control at a national level or simply reflected different population samples is uncertain. It was however noteworthy that about a third of those who were aware, were on treatment with almost 60% of the treated being controlled; highlighting the significance of screening and linkage to treatment.

Pregnancy-induced rise in BP was also noted as a significant risk factor for hypertension, further highlighting the need for systematic antenatal BP screening and follow-up after delivery. Current hypertension guidelines recommend initial dual antihypertensive therapy, yet our data showed that a significant proportion were only on monotherapy, depicting a gap in knowledge among the health care providers that could be addressed to achieve higher control rates.
In conclusion, lack of awareness, largely due to unavailability of reliable screening programs, remains a barrier to population BP control. Global initiatives like MMM and HHA are promising in terms of raising awareness, promoting early diagnosis and linkage to care.

Data availability

All the data are available from the May Measurement Month depository.

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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 |
|--------------------|------------------------------|---------------------------------|------------------------------------------|-----------------------------------------------------|--------------------------------------------------|
| 33 992             | 8870 (26.1%)                 | 3060 (34.5%)                   | 2790 (31.5%)                             | 1667 (59.7%)                                       | 1667 (18.8%)                                     |

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