

Analysis of blood pressure and selected cardiovascular risk factors in the Democratic Republic of the Congo: the May Measurement Month 2018 results

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KEYWORDS

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Hypertension (HT) is the largest contributor to cardiovascular disease mortality and is characterized by high prevalence and low awareness, treatment, and control rates in sub-Saharan Africa. May Measurement Month (MMM) is an international campaign intended to increase awareness of high blood pressure (BP) among the population and advocate for its importance to the health authorities. This study aimed to increase awareness of raised BP in a country where its nationwide prevalence is yet unestablished. Investigators trained and tested how to use the campaign materials, collected participants' demographic data, lifestyle habits, and obtained from each one three BP measurements. Hypertension was defined as a BP $\geq 140/90$ mmHg, or use of antihypertensive medication. Of the 18 719 screened (mean age 41 years; 61.4% men), 26.1% were found to be hypertensive of whom 46.3% were aware of their condition and 29.6% were taking antihypertensive medication. The control rate of HT was 43.0% in those on medication and 12.7% among all hypertensive respondents. Comorbidities found were—diabetes (3.3%), overweight/obesity (35.5%); and a previous stroke and a previous myocardial infarction were reported by 1.2% and 2.0%, respectively. Imputed age- and sex-standardized BP was higher in treated hypertensive individuals (135/85 mmHg) than those not treated (124/78 mmHg). Based on linear regression models adjusted for age and sex (and an interaction) and antihypertensive medication, stroke survivors, those who drank once or more per week (vs. never/rarely), and overweight/obese participants were associated with higher BP. MMM18 results in the Democratic Republic of the Congo corroborated the high prevalence of HT in Kinshasa screenees with low rates of treatment and control. Extension of the MMM campaign to other parts of the country is advisable.

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Introduction

Hypertension (HT) is ranked as the leading cause of global morbi-mortality¹ and is associated with a high mortality rate from stroke, cardiac, and renal failure.^{2,3} In the Democratic Republic of the Congo (DRC), whilst the nationwide prevalence of HT is unknown, in some urban and rural areas it has been reported to reach 30–40%^{4–6} with 46.6% of hypertensive people aware of their condition, 29.9% on medication, and only 18.3% controlled.⁴ The May Measurement Month (MMM) campaigns initiated by the International Society of Hypertension offer sub-Saharan Africa the opportunity to gather information yearly on high blood pressure (BP) and selected risk factors in adults. In 2017, DRC did not join the MMM campaign but in 2018, the Congolese Hypertension League (CoHL) decided to participate in the MMM18 event.

Methods

The CoHL invited all Congolese cardiovascular associates to volunteer in this campaign of screening for HT. The volunteers were trained during a 6-h session to familiarize with the International Society of Hypertension (ISH) *ad hoc* tools. The campaign targeted not only the four mostly crowded sites in Kinshasa (Rond point Ngaba, Masina quartier II, Rond point Victoire, and UPN), but also homes, churches, workplaces, markets, supermarkets, hospitals, military caserns, and so on. The investigators used a questionnaire to get demographic data and risk factors from respondents. They used the Omron BP monitors, with appropriate sized cuff, following MMM standards for measuring three consecutive BP readings for each participant.⁷ Hypertension was defined as a BP ≥ 140 mmHg systolic BP (SBP) and/or ≥ 90 mmHg diastolic BP (DBP) based on the mean of the 2nd and 3rd BP readings or self-reported use of antihypertensive medications.^{7,8} Data were analysed by the MMM central team and multiple imputation was performed to estimate the mean of the 2nd and 3rd BP readings if either readings were missing.⁹

Results

Of the 18 719 participants (men: 61.4%; Black: 99.3%; mean age: 41.5 ± 14.8 years), 3.3% had diabetes, 2.0% had a previous myocardial infarction, and 1.2% had a previous stroke, 12.5% were regular drinkers (once or more per week), 11.9% were smokers, and 4.9% of women were pregnant. In 36.4% of participants, BP had never been previously recorded. The mean body mass index was 24.2 ± 4.4 kg/m² and the rate of underweight, healthy weight, overweight, and obesity was 5.4%, 57.6%, 25.7%, and 9.8%, respectively (Supplementary material online, Appendix Table A1).

Out of 4885 (26.1%) hypertensive subjects, 2262 (46.3%) were aware of their condition and 1446 (29.5%) were being treated with drug of whom 622 (43.0%) were controlled. The rate of overall HT control was 12.7%. Of those not on antihypertensive medication, 3439 (19.9%) were found to have raised BP.

The respondents' age-sex (with an interaction) and anti-hypertensive medication adjusted BP was lower in underweight people, higher in overweight/obese individuals (Supplementary material online, Appendix Figure A1); it was lower when recorded on the left (vs. the right) arm but higher in those drinking alcohol ≥ 1 time a week (vs. those who rarely/never drink), in aware and treated hypertensive subjects and stroke survivors, and, for SBP only, in diabetic patients (Supplementary material online, Appendix Figures A2 and A3).

The link between BP, age and gender in individuals not receiving treatment showed a linear increase in SBP for both men and women. Diastolic BP increased up to age 60y and tended to decline thereafter. Compared to men, BP in women is higher between 50 and 75 years, lower after 75 years. Before 50 years, whilst SBP was higher in men, DBP was similar in both genders (Supplementary material online, Appendix Figure A4).

Discussion

The observed 26.1% proportion of respondents with HT appears lower than the 30.8% reported in the VITARAA study in an area of Kinshasa,⁴ or the 33.5%, 34.5%, and 41% reported in the global MMM18,¹⁰ MMM17/Angola,⁹ and MMM17/Brazzaville,¹¹ respectively. The proportion of hypertensive people under medication, and those with BP controlled was lower than the 29% and 18.3% from the VITARAA study, respectively.⁴ Such observations, together with a huge proportion of participants with BP never recorded, highlight insufficient overall management of HT in DRC. Furthermore, elevated BP levels among aware and treated hypertensive subjects, diabetics and stroke survivors should be considered as a feature of pejorative cardiovascular prognosis.^{2,3}

In keeping with the literature, the relationship of BP with age and gender,^{4,5,12,13} could depend on sex-specific patterns of cardiac and vascular ageing.¹⁴ Lower BP among underweight individuals, and higher values in overweight/obese and alcohol consumers concur with previous surveys,^{5,15} although the mechanisms underlying the association of BP to alcohol consumption are not fully ascertained.¹⁶ Higher pressures are more frequent in the right arm in systole, and to a similar extent but less often in diastole.¹⁷

MMM18/DRC results comprise flaws and strengths. A single series of three BP measurements to define HT is not the optimal recommended rule for HT diagnosis. Moreover, the enrolled population was not a random sample of the city dwellers which precludes extrapolation of the findings to the general population. Nevertheless, this is the largest BP screening ever conducted in DRC, that has allowed access to 36.4% of people whose BP had never been recorded previously. The campaign has also allowed referral to health care facilities of subjects unaware of their high BP.

Conclusion

The MMM18 results in DRC corroborated the elevated prevalence of high BP and lower rates of HT treatment and

control reported in previous studies. They argue for continuity of the MMM campaign and its extension to other parts of the country.

Supplementary material

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

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MMM18/DRC investigators

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