


# May Measurement Month 2021: an analysis of blood pressure screening results from Republic of the Congo, in the context of COVID-19 pandemic

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## KEYWORDS

Hypertension;  
Blood pressure;  
Alcohol intake;  
COVID-19;  
Congo

To determine the proportion of hypertension among opportunistic screenees in the Republic of the Congo, and the relationships between, blood pressure (BP), alcohol intake, and history of coronavirus disease 2019 (COVID-19). Screening was carried out in July and August 2021 in Brazzaville, Pointe-Noire, and Pokola, after ethical clearance had been obtained. The campaign followed the guidelines outlined in the MMM21 protocol, collecting ideally three BP readings for each participant. The screening was carried out during the partial confinement of the population, due to the COVID-19 pandemic. Social distancing measures and protection against the transmission of COVID-19 were adhered to. A total of 2135 subjects were screened of which 1138 (53.3%) were male. The mean age was  $29.9 \pm 9.9$  years (range: 18-69 years), and 2110 participants (98.8%) were of black ethnic origin. A previous COVID-19 positive test was reported in 217 (10.2%) and vaccination in 93 (4.4%). Diabetes was reported in 113 (5.3%), 16 (0.7%) were current smokers, 171 (8.0%) reported using alcohol intake at least once per month, and 539 (25.3%) reported meeting the WHO guidelines on physical activity. The proportion of participants with hypertension ( $\geq 140/90$  mmHg or taking BP-lowering medication) was 34.1%, of whom 24.5% were aware, 11.9% were on medication, and only 4.0% were controlled ( $< 140/90$  mmHg). Rates of hypertension are high in the Republic of Congo, with low rates of awareness and treatment, and national authorities should address the contributing factors highlighted in this report to improve health care for the population.

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## Introduction

The prevalence of hypertension is increasing worldwide. In Republic of the Congo, the proportions of hypertension vary from 22.2% to 41% according to the studies carried out within the framework of the May Measurement Month (MMM) initiative, an awareness campaign which started in 2017.<sup>1,2</sup>

Rates of complications from hypertension which occur early and are often severe and high in Congo.<sup>3</sup> Indeed, hypertension is the biggest single cause of heart failure (45.7%) which has a high mortality rate of 10.7%.<sup>4</sup> Stroke also remains prevalent in Congo and is the leading cause of cardiovascular emergencies, with high mortality.<sup>3</sup> Another complication of hypertension is renal failure, which poses a problem to management, due to the limited access to dialysis, and a very high mortality of 50% in a hospital environment.<sup>5</sup>

In view of the situation of hypertension in Congo, it seemed appropriate to identify reliable statistics in order to improve patient care. Membership in the global MMM initiative, has made it possible to regularly update statistics on hypertension in Congo.<sup>1,2,6</sup>

The onset of the coronavirus disease 2019 (COVID-19) pandemic presented a significant barrier to the on-going efforts and the momentum that had been generated by previous participation in the MMM campaign in Congo. Screening could not be carried out for the year 2020, due to curfews, closures of administrations and schools, and the general confinement of the population.<sup>7</sup> Although containment requirements were partially relaxed in Congo in 2021, we undertook to screen for hypertension in the MMM initiative in the context of COVID-19.

The primary aim of this work was to raise awareness of high blood pressure (BP), and secondarily to determine the proportion of hypertension, an association with alcohol consumption, and to determine the frequency of hypertensive patients who contracted COVID-19 and its impact on the level of BP.

## Methods

This campaign was coordinated by the national coordination of MMM activities (headed by Bertrand Ellenga Mbolla) and the Congolese Society of Hypertension and Internal Medicine (SCHAMI).

Ethical clearance was obtained by the Health Sciences Research Ethics Committee of the Ministry of Health and Population (n° 340/MRSIT/IRSSA/CERSSA signed 1st June 2021).

The screening was carried out in Brazzaville which is the largest city in Congo, Pointe-Noire (Southern Congo), and Pokola (Northern Congo). Screening sites included public places, workplaces, and

churches: Brazzaville (Holy Spirit Poto-Poto Church, El-Bethel Branham Parish, Evangelic Churches of Brazzaville, Cogemo Clinic, Denis Sassou-Nguesso University Medical Center), Pointe-Noire (hospital Adolphe Cisé), and Pokola (doctor's office).

A total of 35 volunteers assisted with the screening efforts. A preliminary training of the investigators was carried out under the supervision of Dr. Bertrand Ellenga Mbolla in the department of cardiology at the University Hospital of Brazzaville, headquarters of the SCHAMI.

In order to cover the costs inherent in this activity, donations were received from: Denis Sassou-Nguesso University, Adolphe-Cise General Hospital, Biogaran Congo, Ajanta Pharma Congo, Denk-Pharma Congo, ETHICA-Congo, EMR-Pharma Congo, and the SCHAMI. This made it possible to cover travel and other expenses of the volunteers, and to acquire necessary equipment.

In an effort to recruit participants for screening public health messages and endorsements were made. In order to facilitate the performance of the screening, authorization from the Director General of Health Services at the Ministry of Health and Population (Republic of the Congo) was obtained. Posters, banners, and media spots were broadcast to raise public awareness.

The screening took place from July to August 2021, in the various sites selected for this purpose. Social distancing measures and protection against the transmission of COVID-19 were adhered to. The BP devices used for screening (OMRON M3, HEM-7131-E) were donated by OMRON Healthcare, via MMM. An information collection sheet had been contextualized according to that provided by MMM. The MMM questionnaire made it possible to collect variables (previous COVID-19 or vaccination, alcohol consumption, and smoking), then the measurement of BP was taken three times in a seated position, and weight and height were measured. The definition of hypertension was a systolic BP  $\geq 140$  mmHg or diastolic BP  $\geq 90$  mmHg or on treatment for hypertension. Obesity was defined as a body mass index  $\geq 30$ .

The data collected was all entered into a Microsoft Excel document, and data were analysed centrally by the MMM project team (London, UK) with multiple imputation performed to estimate the mean of readings two and three where this was missing.<sup>8</sup>

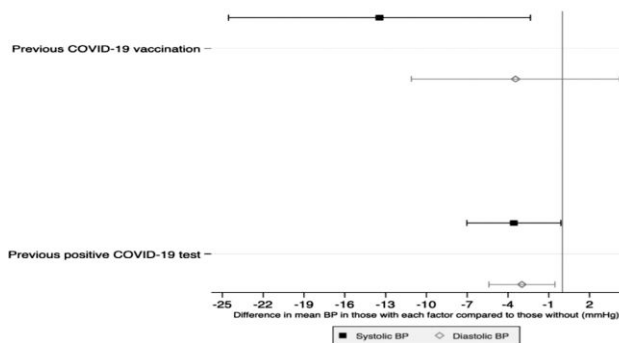
## Results

A total of 2135 participants were screened, of which 1138 (53.3%) were male. The mean age was  $29.9 \pm 9.9$  years (range: 18-69 years). Participants were predominantly black ethnicity ( $n=2110$ , 98.8%; with a smaller number White ( $n=25$ , 1.2%). Participants reported  $>12$  years of education in 1312 cases (61.5%). A previous COVID-19 positive test was reported in 217 (10.2%) and vaccination in 93 (4.4%). Diabetes was reported in 113 (5.3%), current smoking in 16 (0.7%), alcohol intake ( $>1-3$  times per month) in 171 (8.0%), physical activity meeting the WHO guidelines in 539 (25.2%) participants.

**Table 1** Total participants and proportions with hypertension, awareness, number of patients on medication and with controlled BP

Participants (n)	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
All (2135)	728 (34.1)	24.5	11.9	33.2	4.0
Female (899)	350 (38.9)	26.1	16.6	36.0	6.0
Male (1138)	345 (30.3)	19.2	8.4	27.6	2.3
Age $\geq 60$ years (31)	23 (75.7)	95.7	68.2	27.1	18.5

34.1% of participants had hypertension, of whom 24.5% were aware, 11.9% were on antihypertensive medication, and 4.0% were controlled (<140/90 mmHg). Of those on medication, 33.2% were controlled (Table 1). Hypertension was more common in females than males, with higher rates of awareness, treatment, and control. Rates of hypertension and awareness were significantly higher in those aged > 60 years or over.



## Discussion

In 2135 participants screened in the MMM21 campaign, hypertension was found in 34.1%, of whom only 24.5% were previously aware, and 11.9% were treated. Only 33.2% of treated patients were controlled, with a disparity according to sex. In comparison with previous campaigns (MMM18/MMM19), the proportions of hypertensive awareness (40.2 and 42%), those on treatment (36.0 and 37.3%), and those controlled (16.0 and 23.3%) were higher than those reported during MMM21 screening.<sup>2,6</sup> Although years cannot be directly compared due to sample differences due to opportunistic screening across years, these disparities may be explained partly by the reduction in access to care linked to the confinement of the population with regard to the COVID-19 pandemic, but also to the supply of care which remains deficient.<sup>3,7</sup>

This study had certain limitations in that the screening did not cover the whole country, and recruitment was opportunistic. As a result, the findings may not be nationally representative.

Based on the findings from MMM21, with low rates of awareness, treatment, and control, particularly in younger populations, there is a need to continue with opportunistic screening activities in order to target a wider segment of the population.

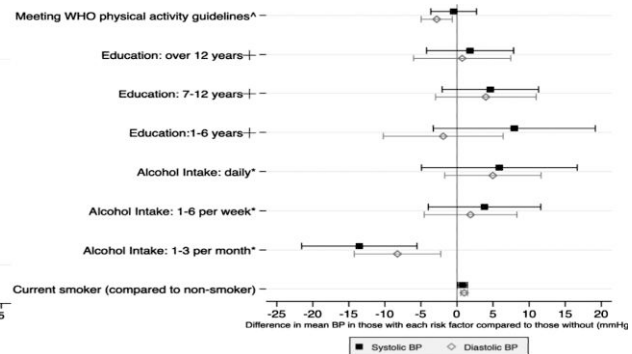
## Acknowledgements

Elenga Maurille, Abena Ange Antoine, Monabeka Henri Germain, Eyeni Sinomono Tony, Reverend Ngoyi Claude Hervé Muller, Balossa Eve, Elomba Sam Niger, Ngoula Bazitama Chany, Mouanga Charlande, Mfoutou Roger, Zobadila Lorvi, Dibala Grace, Kouikani Franck Yannis, Bakala Stéphanie, Ngatali Princilia, Nzaou César, Malonga Axhel, Moutahirou Mahamoud, Ntsoumou Victor, Kouakou Didace Fluyard, Mabilia Tiennelle Wann, Njilo Didier, Ngangoue Bely Quenum, Goma Alice Chimène, and Ndongou Victorien.

## Funding

Denis Sassou-Nguesso University, Adolphe-Cise General Hospital, Biogaran Congo, Ajanta Pharma Congo, Denk-Pharma Congo, ETHICA-Congo, EMR-Pharma Congo and the SCHAMI.

**Conflict of interest:** none declared.



## Data availability

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

## References

1. Ellenga Mbolla BF, Ossou-Nguet PM, Ikama SM, Bakekolo RP, Kouala Landa CM, Passi-Louamba C *et al.* Rates of untreated, treated, and controlled hypertension and relationships between blood pressure with other risk factors in Brazzaville (Republic of the Congo): May Measurement Month 2017 Sub-Saharan Africa. *Eur Heart J* 2019;21: D44-D46.
2. Ellenga Mbolla BF, Kouala Landa CM, Bakekolo RP, Makani Bassakouahou JK, Bouithy SN, Eyeni Sinomono T *et al.* May Measurement Month 2018: an analysis of blood pressure screening results from Republic of the Congo. *Eur Heart J Suppl* 2020;22:H47-H49.
3. Gombet TR, Ellenga Mbolla BF, Ikama MS, Ekoba J, Kimbally Kaky G. Cost of emergency cardiovascular care at the university hospital center of Brazzaville. *Med Trop* 2009;69:47-49.
4. Ellenga Mbolla B, Bianza JR, Ondze-Kafata I, Kouala Landa CM, Bakekolo R, Ikama M *et al.* First episode of heart failure at Teaching Hospital of Brazzaville. *Arch Cardiovasc Dis Suppl* 2018;10:47.
5. Eyeni Sinomono DT, Loumingou R, Gassongo Koumou GC, Mahoungou GH, Mobongo JL. Chronic renal failure in the Brazzaville university hospital center: epidemiological, clinical and evolutionary aspects. *Saudi J Kidney Dis Transpl* 2021;32:1450-1455.
6. Ellenga Mbolla BF, Makani Bassakouahou J, Kouala Landa C, Monabeka MG, Ossou-Nguet PM, Mongo Ngamami SF *et al.* May Measurement Month 2019: an analysis of blood pressure screening results from Republic of the Congo. *Eur Heart J suppl* 2021;23:B49-B51.
7. Report n° AUS0002283. *Republic of the Congo Economic Update: Living in Times of COVID-19*. 8th ed. Washington DC, USA: World Bank Group; 2021. <https://www.worldbank.org/en/country/congo/publication/republic-of-congo-living-in-times-of-covid-19-what-do-the-surveys-reveal-about-households-and-companies> (download 10/2/2023).
8. 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.