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May Measurement Month 2022: an analysis of blood pressure screening results from Colombia

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The May Measurement Month (MMM) campaign was carried out in Colombia in 2022 with the aim of raising awareness of raised blood pressure (BP). Here, we report on the findings of the campaign. Adults aged ≥18 years were recruited opportunistically at healthcare and public facilities in 11 departments. Three seated BP readings were taken for each participant, along with completion of a questionnaire on demographics, lifestyle factors, and comorbidities. Hypertension was defined as a systolic BP ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg or being on antihypertensive medication. Controlled BP was defined as being on antihypertensive medication with a BP < 140/90 mmHg. Multiple imputation was used to estimate any missing BP readings. In total, 38 924 were screened, with a mean age of 46.3 years and 52.9% of whom were female. Of all participants, 10 738 (27.6%) had hypertension, of whom 7058 (65.7%) were aware, and 6925 (64.5%) were on antihypertensive medication. Of those on antihypertensive medication, 4600 (66.4%) had controlled BP, and of all participants with hypertension, 42.8% had controlled BP. However, those under 50 years had lower hypertension control (<30%). Women had a higher BP control than

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men (49.5% vs. 36.3%). High education was associated with lower systolic BP (−2.37 mmHg). The MMM campaign in Colombia identified significant numbers of participants with either untreated or inadequately treated hypertension. MMM22 results point to the need to continue improving awareness and seek a broader implementation of strategies with proven efficacy in controlling hypertension.

Introduction

Raised blood pressure (BP) is one of the largest contributors to the global burden of disease.[1] In Colombia, the Prospective Urban Rural Epidemiology (PURE) study of community-dwelling adults between 35 and 50 years reported a prevalence of hypertension of 37.7%.[2] After a 12-year mean follow-up (SD 2.3), the risk of cardiovascular disease (CVD) increased by 25% for every 20 mmHg increase in systolic BP (HR 1.25; 1.12-1.40).[2] A sub-analysis of PURE in South America ($n = 24\,718$), including Colombian individuals, demonstrated that hypertension is the principal modifiable risk factor for CVD and second for general mortality, with a population attributable fraction of 18.7% and 12.0%, respectively.[3]

Colombia participated in May Measurement Month (MMM) in 2017, 2018, and 2019. In MMM19, 13 departments participated, and 48 324 BP measurements were taken. The overall percentage of participants with hypertension was 27.9%; approximately two-thirds of participants with hypertension were aware of their condition (63.7%) and were taking BP-lowering medication (60.0%). However, only 38.4% were adequately controlled.[4] In this paper, we report on the findings of the MMM22 campaign in Colombia.

Methods

May Measurement Month is a cross-sectional opportunistic survey of consenting adults aged 18 years or over. The programme in Colombia was co-ordinated by the Universidad de Santander (UDES) over May and September. Screening sites were set up in healthcare facilities such as hospitals and clinics and public spaces in 11 departments of the country (Valle del Cauca, Risaralda, César, Cundinamarca, Nariño, Atlántico, Cauca, Caldas, Santander, Quindío, Norte de Santander). The principal investigator in each department trained volunteers to obtain correct BP measurements following the MMM protocol.[5] The campaign was advertised via mainstream and social media. A promotional brochure was created to promote the campaign.

In accordance with the standard MMM protocol, participants ideally had three seated BP readings measured at 1 min intervals.[5] OMRON HEM 7120 monitors were used to measure BP. A questionnaire was also completed, collecting information on demographics, comorbidities, lifestyle risk factors, and antihypertensive medication use. Hypertension was defined as a raised BP (a systolic BP $\geq$ 140 mmHg and/or diastolic BP $\geq$ 90 mmHg based on the mean of the second and third readings) or being on antihypertensive medication. Controlled BP was defined as being on medication with a BP < 140/90 mmHg. Participants found to have raised BP were provided with diet and lifestyle advice, and additional recommendations for attending healthcare services were included in the promotional brochure.

Data were collected locally via the MMM app, spreadsheets, and paper forms and submitted to the central MMM team for cleaning and analysis. In cases where any BP reading was missing, to ensure comparability between participants, the average of the second and third readings was estimated by multiple imputation using chained equations, based on global data as described previously.[5] For comparison with other countries participating in MMM, results are also presented after age and sex standardization using the World Health Organisation world standard population, and assuming an equal gender split.[6] The study received ethical approval from the Institutional Review Board of UDES, approval number VII - 053 - BUC.

Results

In total, 38 924 were screened during MMM22 in Colombia. The mean (standard deviation) age was 46.3 (19.3) years, and 20 592 (52.9%) were female. Overall, 20 861 (53.6%) were self-defined as Mestizo, 8877 (22.8%) as White, 1030 (2.6%) as Black, and 7576 (19.5%) as other ethnicities. Of all participants, 2252 (5.8%) reported never having had a BP measured before.

Multiple imputation was used to estimate missing BP readings for 2485 (6.4%) participants missing data on the second or third BP reading. Of all participants, 10 738 (27.6%) were found to have hypertension, of whom 7058 (65.7%) were aware, and 6925 (64.5%) were on antihypertensive medication (*Table 1*). Of those on antihypertensive medication, 4600 (66.4%) had controlled BP, and of all hypertensives, 42.8% had controlled BP. Of participants who were not taking antihypertensive medication, 3813 (11.9%) were found to have raised BP. In total, 6138 (15.8%) were found to have either untreated or inadequately treated hypertension.

After age and sex standardization, 9268 (23.8%) were found to have hypertension, of whom 5330 (57.5%) were aware, 5216 (56.3%) were on antihypertensive medication, and 3547 (38.3%) were controlled (*Table 1*).

Compared to females, males were found to have a higher prevalence of hypertension (29.9% vs. 25.6%) but lower awareness (58.3% vs. 73.3%), use of BP-lowering medications (57.4% vs. 71.8%), and percentage of control (36.9% vs. 49.5%). At older ages, the percentage of individuals with hypertension increased (up to 60.5% in ≥70 years), as well as hypertension awareness (up to 81.5% in ≥70 years). However, those under 50 years had lower hypertension control, with percentages of control < 30% (*Table 2*). Finally, in mixed effects linear regression models adjusted for age and sex (with interaction) and use of BP-lowering medication, having more than 12 years of education was associated with 2.37 mmHg (95% CI: −3.50, −1.24; $P < 0.001$) lower systolic BP on average, compared to having no formal education.

Table 1 Total participants and numbers with hypertension, awareness, on medication, and with controlled blood pressure, before and after age and sex standardization

	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
Actual	38 924	10 738 (27.6)	7058 (65.7)	6925 (64.5)	4600 (66.4)	4600 (42.8)
Standardized	38 888[a]	9268 (23.8)	5330 (57.5)	5216 (56.3)	3547 (68.0)	3547 (38.3)

[a]Standardized total lower than actual total, as 36 participants did not have information recorded on age or sex.

Table 2 Hypertension prevalence and percentages aware, treated, and with blood pressure controlled, stratified by age

Age (years)	Total	Prevalence (%)	Awareness (%)	Medication use (%)	Control (%)
18-29	10 181	7.0	15.6	14.8	11.6
30-39	6327	11.5	32.6	30.1	19.6
40-49	5334	22.1	48.2	47.2	29.0
50-59	5956	34.9	64.9	63.8	43.3
60-69	5357	47.4	76.5	75.1	51.3
≥70	5769	60.5	81.5	80.4	52.4

Discussion

The MMM22 programme identified a total of 6138 (15.8%) participants with untreated or inadequately treated hypertension, highlighting the scale of hypertension in Colombia. Of the total 38 924 participants, hypertension prevalence, awareness, treatment, and control have slightly improved compared to previous years. After four campaigns between 2017 and 2022, including roughly 145 000 measurements, the pooled prevalence of hypertension among opportunistically screened adults in Colombia was 26.2% (22.8–27.9%). Although there is an improvement in the percentage of hypertension control, it remains <45%. While two-thirds of participants with hypertension were aware of their condition, in those under 50 years of age, less than half were aware of their condition, and hypertension control was notably lower in men compared to women. Furthermore, after adjusting for sex, age, and use of BP-lowering medication, having more than 12 years of education was associated with a 2 mmHg lower systolic BP compared to having no formal education. Thus, young men with few years of formal education are those that should be considered as a focal group for implementing interventions to improve hypertension control. These individual features associated with lower hypertension control are as described at the baseline of the PURE-Colombia cohort might contribute to explaining the higher CVD rates in men than in women.[7] Namely, the effect of chronic exposure to high BP over time in men compared to women.

Strengths and limitations

A strength of the MMM campaign is the use of a standardized protocol across countries, which aids comparability of findings. Participants in MMM were recruited opportunistically using convenience sampling and as a result, estimates should not be interpreted as estimates of national prevalence. Hypertension was defined based on three BP readings at a single visit for pragmatic reasons that is not the optimal method of diagnosis at the individual level as recommended in guidelines.[8] Consequently, the rate of hypertension detected is likely to represent an overestimate.

Conclusion

The MMM22 campaign in Colombia demonstrates that despite individuals with hypertension awareness and medication use being around 65%, hypertension control remains low. These results are driven mainly by those under 50, where medication use and control are lower compared to older people. Therefore, MMM22 results lead to a call to action to continue improving hypertension awareness in overall population and seek a broader implementation of strategies with proven efficacy to increase treatment adherence, such as team-based care with community health workers, fixed-dose combination therapy, electronic decision-support systems, and home blood pressure monitoring, particularly in middle-aged adults with hypertension.

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Conflict of interest: none declared.

Data availability

Data are not publicly available but access can be requested with permission from the MMM Management Board, on request through the MMM website: maymeasure.org.

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