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# May Measurement Month 2018: an analysis of blood pressure screening results from Colombia

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High blood pressure (BP) is the leading global preventable cause of death and the most common risk factor for cardiovascular disease (CVD). However, due to its asymptomatic nature, the lack of awareness of this condition causes underdiagnosis and low rates of adherence to pharmacological treatment. Looking for practical approaches to increase awareness worldwide, the International Society of Hypertension (ISH) implemented the 2nd May Measurement Month campaign in 2018 (MMM18). In order to contribute to this initiative, Colombia participated as one of the 89 countries involved in this hypertension screening programme. Blood pressure was measured in subjects from 11 departments in Colombia. Under the leadership of the Fundación Oftalmológica de Santander (FOSCAL), 400 volunteers across the country collected the data following the MMM protocol. Measurements from 35 548 participants with a mean age of 41.9 years were obtained. In total, 9475 (26.7%) of the total population studied had hypertension. Of those with hypertension, 69.9% of these subjects were aware of their condition, 65.0% were on antihypertensive medication, and 43.1% had controlled BP. Of those on medication, 66.3% had controlled BP. Hypertension screening, awareness, treatment, and control should be a priority

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in public health objectives due to its elevated burden of disease and direct association with increased CVD. The MMM campaign provided a positive impact in the diagnosis of hypertension across Colombia. Although efforts are being made to expand treatment capability and adherence, still more are needed to insure a broader coverage of antihypertensive medication in Colombia.

## Introduction

Cardiovascular disease (CVD) is the first global cause of death, particularly in low/medium-income countries.[1] By 2015, 201 510 deaths due to ischaemic heart disease and 48 553 deaths due to stroke were attributed to Latin American countries, including Colombia.[2] Hypertension is the most common risk factor for CVD and is the most important preventable global cause of death.[1,3] Thus, the diagnosis and treatment of hypertension is a crucial point for reaching the World Health Organization's (WHO's) goal of reducing 30% of CVD global mortality by 2030.[4] May Measurement Month 2017 (MMM17),[5] which included 22 258 Colombian adults, reported 22.8% of these individuals had hypertension. Also, even though 91.2% of subjects with hypertension were on pharmacological treatment, 71.4% of them had controlled blood pressure (BP), defined as arterial BP $<$140/90 mmHg. Furthermore, the Colombian High-Cost Account Organization, who manages information from the health insurance companies, reported in 2017 3 776 893 people had hypertension with a higher prevalence in women than in men (61.6% vs. 38.3%, respectively). Between 2016 and 2017, 28 105 new cases were diagnosed.[6] MMM was created following the initiative of the International Society of Hypertension (ISH) to expand on World Hypertension Day which had been introduced by the World Hypertension League (WHL) to increase the rate of awareness of hypertension. Colombia took part in this global campaign for its second consecutive year. We present here the 2018 results, comparing them with the MMM17 report.[5]

## Methods

The campaign was led by the Fundación Oftalmológica de Santander (FOSCAL) and Universidad de Santander (UDES), with the support of the Latin American Society of Hypertension (LASH), the Red Colombiana de Prevencion de Enfermedades Cardiovasculares y Diabetes (RECARDI), and the Sociedad Colombiana de Cardiología. Due to national regulation policies for observational studies, ethics committee approval was not necessary. This process involved 400 volunteers from 11 departments in the country. The principal investigator from each department received training provided by FOSCAL and UDES personnel. Each leader then established and trained their working staff, which involved health care students, community leaders, health promoters, nurses, nurse assistants, and researchers. The initiative took place in institutional, educational, working, and community environments. OMRON monitors (Model: HEM7121), kindly donated by OMRON Healthcare (Pacific Region) were used for measuring BP. Each participant provided written consent that authorized the use of their information before taking their measurements. The data collection and BP measurements fulfilled the MMM protocol. Participants had their BP taken three times while seated, with a 2-min interval between each measurement. We defined hypertension if the systolic BP was $\geq$140 mmHg, or the diastolic BP was $\geq$90 mmHg based on the mean of the 2nd and 3rd BP reading, or those who were on antihypertensive medication. In cases where the mean of the 2nd and 3rd readings was not available, multiple imputation was used to estimate the missing readings, according to the global data.[7] Height and weight measurements were taken when possible, but it not possible, self-reported. The data collection and analysis has been described in previous reports.[5,7]

## Results

Adults (35 548) with a mean age of 41.9 years (SD 18.9) were included in the analysis. In total, 57.4% were women. The majority of the participants belonged to a mixed ethnic group (51.7%). After multiple imputation, 9475 (26.7%) participants were identified with hypertension. From the individuals with hypertension, 6619 (69.9%) were aware of their condition, and 6158 (65.0%) were on antihypertensive medication. In total, 4081 (66.3%) of those on pharmacological treatment had controlled BP ($<$140/90 mmHg). In total, 3317 (11.3%) participants who indicated that they were not on pharmacological treatment or provided no information on this matter, had hypertension. When analysing all hypertensive subjects, both on medical treatment and without medical treatment, the proportion of controlled BP was 43.1%. After adjusting for age, sex, and taking hypertension medication, a history of diabetes, prior heart attack, and prior stroke were associated with higher systolic BP compared to those without these comorbidities.

## Discussion

Just over one-quarter of our study population had hypertension, and 69.9% of these knew about their condition. Furthermore, although 65.0% of the participants with hypertension received medical treatment, only 66.3% of these had BP values $<$140/90 mmHg. Importantly, we detected 11.3% of those not taking medication as having high BP. When comparing these results with those obtained in MMM17,[5] MMM18 included 13 290 more participants, and

there was a 3.9% increase in the prevalence of hypertension. The pharmacological treatment on MMM18 was similar but 1.7% lower in the proportion of subjects taking antihypertensives compared with results from 2017 (65% vs. 66.7%). Nonetheless, compared to the global proportion of 55.3% and other high-middle income countries, Colombia had a higher proportion of hypertensive subjects receiving medical treatment (65%).[7] MMM18 in Colombia shows that fewer than one-third of hypertensive subjects were unaware of their condition.[5] However, the proportion of awareness is higher compared with the MMM global analysis (69.1% vs. 59.5%).[7] These results show that, like in Colombia, the implementation of guidelines proposed by the World Heart Federation (WHF) and the WHO, including the '25 × 25' strategy, can improve the detection and control of this main cardiovascular risk factor.[8] An example of the effort made to achieve this objective is the Heart Outcomes Prevention Evaluation 4 study (HOPE 4).[9] This community-based randomized study evaluated a new model approach based on non-physician health workers using simplified algorithms to detect cases of hypertension, free medication administration, and the involvement of family members and friends to improve treatment, adherence, and medical follow-up. This intervention provided a 40% reduction in the 10-year risk score of CVD and doubled the number of individuals with controlled BP compared to the control group receiving standard care. MMM18 results also show that 11.3% of all subjects without pharmacological treatment had elevated BP and should be receiving antihypertensive medication. Meanwhile, 66.3% of participants on antihypertensive treatment had controlled BP. This highlights the importance of pharmacological treatment in hypertensive subjects, providing evidence to support that antihypertensive treatment is a keystone for controlling high BP. [10,11]

An interesting difference observed when comparing our population with MMM18 global data, is that subjects with diabetes, or a prior history of myocardial infarction or stroke, were associated with elevated systolic BP compared to subjects without these conditions. Meanwhile, in the MMM18 global analysis, these risk factors were associated with a decrease in systolic BP.[7] These results could be related to the known barriers that yet exist in our health system—for example, deficiency in secondary prevention programmes for CVD that lead to poor control of the main risk factors such as the availability and capability of antihypertensive medication for controlling BP. The PURE results suggest that mortality in poorer countries is not related to risk factors but poor health care access; a concept which is supported by the results obtained in this report.[12]

Overall, the MMM18 results are similar to previous recent prospects in our population. Little differences are observed with the results reported by the Colombian High-Cost Account Organization.[6] However, there are some limitations worth mentioning due to this report's data collection method. Subjects who participated in this campaign were those who were interested in knowing their BP on the month this project took place and therefore volunteered to participate in this hypertension screening. Hence, selection bias limits the possibility of stating that these results are a nationally representative sample since participants were not randomly selected.

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