

Results of the May Measurement Month 2017: blood pressure campaign in Venezuela—Americas

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Cardiovascular diseases, mainly coronary heart disease and stroke, are the first cause of death in Venezuela; and hypertension is the main risk factor. May Measurement Month (MMM) is a global initiative aimed at raising awareness of elevated blood pressure (BP) and to act as a temporary solution to the lack of regular screening programmes. Some representative studies indicate prevalence of hypertension in Venezuela between 24 and 39%, and control rate around 20%. Sixty-four sites were included to participate in MMM, mainly in pharmacies. Physical measurements included height, weight, and abdominal circumference. Blood pressure was measured in the sitting position three times after resting for 5 min, 1 min apart, using validated oscillometric devices. 21 644 individuals were screened. After multiple imputation, 10 584 individuals [48.9% (50.7% male; 47.7% female)] had hypertension. Of individuals not receiving antihypertensive medication, 1538 (12.2%) were hypertensive. Of individuals receiving antihypertensive medication, 2974 (32.9%) had uncontrolled BP. About 16% had obesity calculated by body mass index; 43.8% of women and 20.7% of men had abdominal obesity. This was the largest BP screening carried out in Venezuela, in which 48.9% of the individuals had elevated BP, untreated hypertension was 12.2%, and one-third of subjects taking treatment were not controlled. About 16% had obesity by body mass index, and abdominal obesity is more common in women. These results suggest that repeated screening like MMM17 can identify hypertension in important numbers and can also evaluate programmes of hypertension treatment and control in Venezuela.

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Introduction

Cardiovascular diseases are the first cause of death in Venezuela; according to Pan-American Health Organization. Hypertension is the risk factor most strongly associated with the first myocardial infarction in Latin American countries.¹ According to CARMELA study, Venezuela had the second highest prevalence of hypertension (24.7%; 27.5% in male and 22.9% in female) after Argentina (Buenos Aires).^{2,3} Other previous studies in Barquisimeto (15 000 subjects),⁴ showed similar prevalence (23.6%; 27.75% male and 21.39% female). Another larger study carried out in Maracaibo (western region) in 7424 subjects showed a prevalence of 39.2% (45.2% in male and 28.9% in female),⁵ with a control rate of 20% or less.⁶

Since 2008 Venezuela has had important changes in political, economic, and social system, and the May Measurement Month 2017 (MMM17) study was an opportunity to address the epidemiology of hypertension and associated risk factors.

Methods

After the protocol was approved by the ethics committee at Dean of Health Sciences of University Centro-Occidental Lisandro Alvarado, in Barquisimeto, Venezuela, 64 sites were distributed in eight different regions of Venezuela. Four or more persons were involved in the process of the study in each site. No special grant was received to carry out the study; but OMRON donated some automatic devices and FARMATODO, an important chain of pharmacies in Venezuela, collaborated to share their branches and personnel to carry out the study in many places during May 2017. Other small groups of subjects were included from universities and health centres.

A short questionnaire was filled in as published.⁷ Measurements were then carried out including blood pressure (BP), height, weight, and abdominal circumference. Blood pressure was measured in the sitting position three times after resting for at least 5 min, 1 min apart. Blood pressure was taken from either arm, using validated oscillometric devices of different brands, but mainly from Omron Healthcare. Manual sphygmomanometers were used in about 1% of readings. Data were entered on paper forms and later transferred to spreadsheets.

Analysis of data was carried out centrally by the MMM project team using the method previously published.⁷

Results

The number of participants included from Venezuela was 21 644 subjects with a mean age of 53.2 years (SD 15.6). More women were included (62.76%), the self-considered ethnicity were predominantly mixed (62.41%) followed by white (30.36%), black (4.02%), and other (3.21%).

Blood pressure was measured three times in 97.9% of subjects. The average BP in 1st, 2nd, and 3rd readings were 126.8/76.1 mmHg, 124.5/74.9 mmHg, and 123.6/74.4 mmHg, respectively; but for analysis the average of 2nd and 3rd readings was used for different calculations.

The proportion of subjects with hypertension in the Venezuelan sample was 47.7% in females and 50.7% in males. Proportion increase with age: Supplementary material online, *Table S1* presents the distribution for age group and sex and by regions; showing the variation in the proportion of hypertension in different regions. There is a higher proportion with hypertension in capital region (54%), and lower in the eastern region (41%) for both sexes.

From the screening of 21 644 individuals, 10 584 (48.9%) had BPs above normal values ($\geq 140/\geq 90$ mmHg); 1538 (12.2%) of those not receiving antihypertensive treatment were found with elevated BP and 2974 (32.9%) of those receiving treatment had uncontrolled hypertension.

Body mass index was calculated for the total population. Supplementary material online, *Table S2* shows the odd ratios for hypertension as body mass index increase.

Abdominal circumference, defined as high ≥ 88 cm in female and ≥ 102 cm in male, was present in 43.8% of women and 20.7% of men; hypertension was more frequent in high circumference subjects of any sex. Systolic/diastolic BPs were higher by 4.2/3.08 mmHg in females and 5.59/4.27 mmHg in males with high abdominal circumference in comparison to normal abdominal circumference after adjustment for age, sex, and antihypertensive medication use.

After adjustment for age and sex, significantly higher systolic and diastolic BPs were apparent in subjects who were receiving antihypertensive drug treatment. Only systolic BP was higher for subjects with self-reported diabetes, previous myocardial infarction, or stroke. Alcohol intake and current smoking showed little impact on BP levels, while pregnant women had lower systolic and diastolic BPs.

Discussion

This study was carried out with a sample of 21 644 subjects and is the largest study of this type in Venezuela. In the previous CARMELA study,⁸ hypertension showed a prevalence of 24.7% (27.5% of males and 22.9% of females) in Venezuela. Another study with broad age groups gave a prevalence of around 34%.⁹

In the present study, the proportion of people with hypertension was 48.9% (50.7% of males; 47.7% of females) in Venezuela, higher than the global MMM17 study (34.9%) and the Americas regions (41%).⁷ Of those not receiving treatment, 12.2% were hypertensive in Venezuela, compared to 17.3% globally and 14.4% in the Americas.⁷ The percentage of subjects on treatment but with uncontrolled BP was 32.9% in our study compared to 46.3% globally and 38.6% in the Americas.⁷ Those results are consistent with the CARMELA study which reported 28.2% of those treated with antihypertensive medication were not controlled.⁸ On the other hand, the percentage of hypertension in Venezuelan regions goes from 54% in the capital region to 41% in the eastern region, in accordance with cardiovascular mortality rates reported in those regions of Venezuela.^{10,11}

Hypertension was more frequent when abdominal obesity was present.¹² Previous studies have indicated an

apparent progressive loss of body mass index in the Venezuelan population since 2008.¹³ Loss of weight for the population could influence lowering BP or an apparent better control of BP.¹⁴ Caraballo-Arias¹⁵ reported important changes in the economy, job situation, and health in Venezuela since 2006 which can explain the weight loss in the Venezuelan population.¹⁶

In the present study, diabetes was present in 10.7% of cases, in contrast with other studies which reported 7.7% (range 6-14.9%) in several Venezuelan regions,¹⁷ and 6.4% in others (central-western region), including fasting glucose determination.¹⁸

The determinant factors on BP in our study were antihypertensive drug treatment, diabetes mellitus, previous myocardial infarction, and stroke, mainly on systolic BP. In contrast, alcohol intake and smoking did not significantly affect BP. However, both alcohol intake and smoking were reported lower than in other studies which may reflect convenience sampling or be due to underreporting by participants or as consequence of the economic situation.

Conclusion

This large cross-sectional survey in Venezuela allows us to state:

- Systolic and diastolic BPs increase with age; they showed typical patterns by age and sex; tend to be higher in obese individuals, either classified by body mass index or by abdominal circumference.
- The proportion of hypertension in Venezuela was higher than the worldwide average or the average in America.
- Treated hypertensive subjects tend to have higher systolic and diastolic BP than not treated and not hypertensive subjects.
- Obesity, previous myocardial infarction or stroke, and diabetes mainly influence systolic BP.
- One-third of treated hypertensives were not controlled.

Supplementary material

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

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Conflict of interest: none declared.

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