

# May Measurement Month 2019: an analysis of blood pressure screening results from Spain

Ana Molinero<sup>1 †</sup>, Eva Calvo<sup>2 †</sup>, Thomas Beaney<sup>3,4</sup>, Emily Day<sup>3</sup>, Rosa Prats-Mas<sup>5</sup>, José A. Fornos<sup>6</sup>, Inés Mera-Gallego<sup>7</sup>, Salvador Tous<sup>8</sup>, Nicanor F. de Andrés<sup>9</sup>, Enrique Rodilla<sup>10</sup>, Teresa Gijón<sup>11</sup>, David Pérez-Manchon<sup>12</sup>, Neil R. Poulter<sup>3</sup>, Gema Ruiz-Hurtado<sup>13,14</sup>, and Luis Miguel Ruilope<sup>13,14,15,\*</sup>

<sup>1</sup>HTA Group of the Spanish Society of Family and Community Pharmacy (SEFAC), Community Pharmacist, Paseo de las Delicias 31, 28045, Madrid, Spain

<sup>2</sup>IBERMUTUA, 28043, Madrid, Spain

<sup>3</sup>Imperial Clinical Trials Unit, Imperial College London, Stadium House, 68 Wood Lane, London W12 7RH, UK;

<sup>4</sup>Department of Primary Care and Public Health, Imperial College London, St Dunstan's Road, London W6 8RP, UK

<sup>5</sup>HTA Group of the Spanish Society of Family and Community Pharmacy (SEFAC), Community Pharmacist Denia, Alicante, Spain

<sup>6</sup>Diabetes Group of the Spanish Society of Family and Community Pharmacy (SEFAC), Community Pharmacist Cangas do Morrazo, Pontevedra, Spain

<sup>7</sup>HTA Group of the Spanish Society of Family and Community Pharmacy (SEFAC), Community Pharmacist Maella, Zaragoza, Spain

<sup>8</sup>HTA Group of the Spanish Society of Family and Community Pharmacy (SEFAC), Community Pharmacist, Barcelona, Spain

<sup>9</sup>Diabetes Group of the Spanish Society of Family and Community Pharmacy (SEFAC), Community Pharmacist, Vigo, Pontevedra, Spain

<sup>10</sup>Internal Medicine, University Hospital Sagunto, Universidad Cardenal Herrera-CEU, CEU Universities, Valencia 46115, Spain,

<sup>11</sup>Primary Care Center Centro del Aire, Majadahonda, Council of the Spanish Society of Hypertension, Madrid 28220, Spain

<sup>12</sup>Departamento de Enfermería, Facultad de Salud, Universidad Camilo José Cela, Madrid 28036, Spain

<sup>13</sup>Cardiorenal Translational Laboratory, Institute of Research i+12, Hospital Universitario, 12 de Octubre, Madrid 28041, Spain

<sup>14</sup>CIBER-CV, Hospital Universitario, 12 de Octubre, Madrid 28041, Spain

<sup>15</sup>European University of Madrid, Madrid 28032, Spain

## KEYWORDS

MMM;  
Blood pressure;  
Hypertension;  
Pharmacies;  
Diabetes;  
Screening;  
Treatment;  
Control

The aim of the May Measurement Month (MMM) is devoted to better understanding the awareness, treatment, and control rates of hypertension in Spain. Presented here are the data corresponding to 2019 campaign. In 2019, a total of 4433 patients (61.5% males) with a mean age of 54.8 years were included. Of all, 96.0% were Caucasian, and 3294 were recruited in pharmacies. The mean values of systolic blood pressure (BP) were 125.6 and of diastolic 76.7 mmHg in the whole population. The most recent previous BP measurement took place more than 1 year before in 27.6% of participants. A total of 1883 were hypertensive (systolic BP  $\geq 140$  mmHg or diastolic BP  $\geq 90$  mmHg or taking antihypertensive medication), of whom 77.2% were aware and 71.1% were on medication. Of all, 64.9% of those on medication and 46.1% of all hypertensive participants had a BP controlled to  $< 140/90$  mmHg. These data from MMM 2019 continue to indicate the need for an improvement in the awareness, treatment, and control of hypertension in Spain.

<sup>†</sup>The first two authors contributed equally to the study.

\*Corresponding author. Email: ruilope@icloud.com

**Table 1** Total participants and proportions with hypertension, awareness, on medication and with controlled blood pressure

Total participants	Number with hypertension	Proportion (%) of all participants with hypertension	Proportion (%) of hypertensives aware	Proportion (%) of hypertensives on medication	Proportion (%) of those on medication with controlled BP	Proportion (%) of all hypertensives with controlled BP
4433	1883	42.5	77.2	71.1	64.9	46.1

## Introduction

The prevalence of hypertension in Spain in 2015 was 36% in woman and 53% in men based on a previous survey, with more than 30% of subjects were unaware of the presence of arterial hypertension and less than one-third were well controlled.<sup>1</sup>

Data published in 2019 showed that Spain has one of the highest life expectancies in the world (78 years in males and 84 in females) at birth and cardiovascular disease is the number one cause of death with ~120 000 deaths per year (one in four in men and one in three in women). Ischaemic heart disease is the biggest contributor to cardiovascular deaths in men and cerebrovascular disease in woman. Spain has one of the lowest age-standardized cardiovascular mortality rates with a steady decline of about 3.5% per year in both sexes.<sup>2</sup>

The chairman of the May Measurement Month (MMM) project Prof. Neil R. Poulter invited Prof. Luis M. Ruilope to organize a network to participate in the project that included doctors in primary care, occupational medicine, and hypertension units and hospitals. Pharmacies and supervised medical students also took part in blood pressure (BP) measurement in public areas during the month of May. The biggest proportion of participants were screened in pharmacies. Spain participated in MMM in 2017 and 2018 and here we present the results of the MMM data collected in 2019.

## Methods

The study coordinator in Spain was Prof. Luis M. Ruilope from the Institute of Research from the Hospital Universitario 12 de Octubre. The project obtained clearance from the Ethical Committee of the Hospital Universitario 12 de Octubre. A total of 498 pharmacies distributed all over Spain, participating in MMM 2019. In Madrid, 25 primary care centres and 10 hospitals and hypertension units took part and 40 measurement sites were set up in public areas in Valencia. The numbers of pharmacists, primary care doctors, doctors in hospital and hypertension units, and medical students taking part were 1572, 80, 15, and 100, respectively. In the pharmacies, primary care centres and hospitals information about the relevance of hypertension and the need to measure it had been available since 2017. At the other measurement sites, similar

information was made available on World Hypertension Day. Screening in pharmacies, primary centres, and hospitals took place from May through early July. We used the OMRON M3 device, to measure BP three times with the patients in the sitting position. Hypertension was defined as a systolic BP  $\geq 140$  mmHg or a diastolic BP  $\geq 90$  mmHg or taking antihypertensive medication. Data were collected via excel software and were cleaned by Dr Ana Molinero, Dr Teresa Gijón, and Dr Enrique Rodilla before being sent to the core centre. State data were analysed centrally by the MMM project team and multiple imputation using chained equations based on the global data was performed to impute the mean of readings two and three where this was not available.<sup>3</sup>

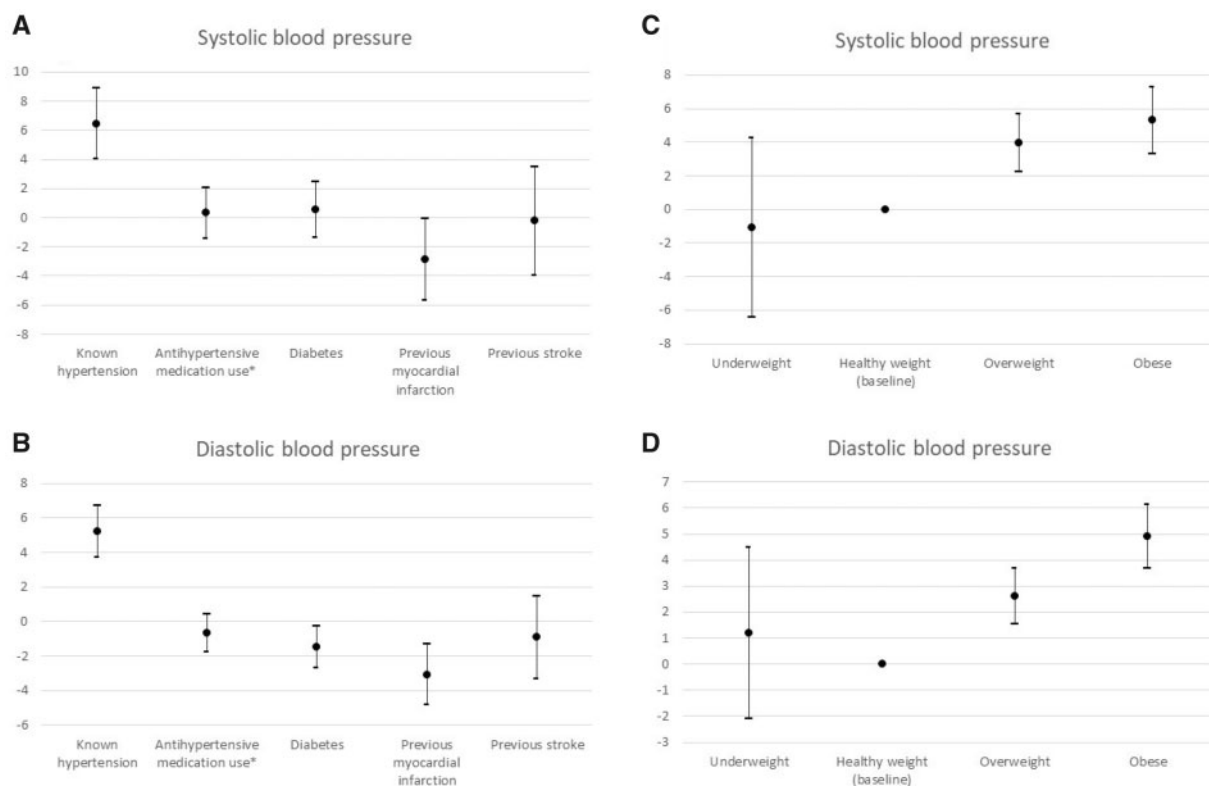
## Results

The mean age of the population was 54.8 years with a median of 57.0 and 61.5% were female. A 30.2% of the total population investigated were taking antihypertensive medication. Of all participants, 20.2% received one antihypertensive drug, 8.1% two drugs, 1.7% three drugs, and 0.1% four drugs. Of the total population, 96.0% were Caucasian, 1.8% were black, 5.1% reported never having had their BP measured, 9.1% were on aspirin, and 17.7% were on a statin.

Table 1 shows the total participants and proportions with hypertension, awareness, being on medication, and with controlled BP. Of all, 1883 (42.5%) of participants had hypertension, of whom 77.2% were aware and 71.1% were on antihypertensive medication. Of those on medication, 64.9% had a controlled BP, and of all hypertensive participants, 46.1% were controlled. Of all, 544 (17.6%) of participants not on antihypertensive medication presented with BP levels in the hypertensive range ( $\geq 140/90$  mmHg). Figure 1 shows the relationship of systolic and diastolic BP with the presence of known hypertension, the association with treatment and the presence of diabetes, previous myocardial infarction, and stroke and body weight strata based on body mass index compared with those without these conditions and with a healthy weight, respectively.

## Discussion

May Measurement Month is a cross-sectional BP screening campaign using opportunistic convenience sampling. By design, it does not necessarily reflect the national situation: a random sample of the whole adult population would



**Figure 1** (A,B) Differences in systolic and diastolic blood pressure in patients with known hypertension, taking antihypertensive medication, having diabetes, a previous myocardial infarction or stroke compared without these conditions/status. (C,D) Differences in systolic and diastolic blood pressure by weight strata based on body mass index compared with those having a healthy weight.

be required to do so. However, future participation in the annual MMM project will contribute to improve awareness at the population and individual level of the importance of BP screening and the need for more effective BP control. It appears that more effort is needed to improve awareness, treatment, and control of hypertension in Spain. Approximately four out of ten participants were found to have hypertension, and of these seven in ten were on antihypertensive medication, but fewer than half (46%) of all hypertensives were controlled. Probably, the most important problem in Spain is that almost one-quarter of hypertensive participants investigated were unaware that they were hypertensive indicating that better screening of the general population is very much required. However, improvement in treatment and control rates are also needed and this will involve enhanced input from patients, doctors, and nurses.

#### Data availability

Data obtained after an informed consent.

**Conflict of interest:** none declared.

#### References

1. NCD Risk Factor Collaboration (NCD-RisC). Long-term and recent trends in hypertension awareness, treatment, and control in 12 high-income countries: an analysis of 123 nationally representative surveys. *Lancet* 2019;**394**:639-651.
2. Bueno H, Pérez-Gómez B. Global rounds: cardiovascular health, disease, and care in Spain. *Circulation* 2019;**140**:13-15.
3. \*3 Beaney T, Schutte AE, Stergiou GS, Borghi C, Burger D, Charchar F, Cro S, Diaz A, Damasceno A, Espeche W, Jose AP, Khan N, Kokubo Y, Maheshwari A, Marin MJ, More A, Neupane D, Nilsson P, Patil M, Prabhakaran D, Ramirez A, Rodriguez P, Schlaich M, Stekelings UM, Tomaszewski M, Unger T, Wainford R, Wang J, Williams B, Poulter NR, on behalf of MMM Investigators. May Measurement Month 2019: the global blood pressure screening campaign of the International Society of Hypertension. *Hypertension* 2020;**76**:333-341. doi: 10.1161/HYPERTENSIONAHA.120.14874 (2020).