

May Measurement Month 2019: blood pressure screening results from Chile

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Hypertension is a major preventable cause of death worldwide. May Measurement Month (MMM) is a global initiative aimed at raising awareness of high blood pressure (BP) and identifying individuals with increased BP. A cross-sectional survey of volunteers aged ≥ 18 years old was carried out in May 2019 in Chile. Participating sites were distributed across the country, most of them from the Public Health System outpatient clinics. In addition, clinical research sites, universities, and private clinics participated. Blood pressure measurement protocol, hypertension categories, and statistical analysis followed the MMM protocol. Hypertension was diagnosed as mean systolic BP ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg or receiving antihypertensive medication. Overall, 6876 individuals were screened. After multiple imputations, hypertension prevalence was 35.4%, of which 65.9% were aware of their condition. While 60.1% were on antihypertensive medication and 34.4% of the total number of hypertensives had their BP controlled. Of participants not receiving antihypertensive treatment, 17.9% were identified as hypertensive. The MMM 2019 survey demonstrated a high proportion of participants with hypertension, with only one-third of these individuals having controlled BP (systolic BP < 140 mmHg and diastolic BP < 90 mmHg). The high percentage of participants with hypertension who were either untreated (39.9%) or were treated but uncontrolled (57.2%) suggesting that such opportunistic screening programmes may be a useful tool to improve hypertension control in Chile.

Introduction

Hypertension is highly prevalent in Chile. The National Health Survey 2016-17 in a random sample of 6233 individuals older than 14 years reported a 27.6% prevalence of hypertension, with a similar prevalence in men and women.¹

Chile participated in the May Measurement Month (MMM) 17 initiative screening 4754 individuals, 24.2% of whom were found to have hypertension. Among individuals not receiving antihypertensive medication, 15.3% were hypertensive and of those treated with antihypertensive medication, 32.5% had uncontrolled blood pressure (BP).² MMM18 involved 9344 participants, of whom 29.2% were

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hypertensive. The proportion of participants who were not receiving antihypertensive medication, and had increased BP was again 15.3%,³ and from those treated with antihypertensive medication, 38% had uncontrolled BP.

In Chile, improving the BP control rate among treated patients is a priority among the strategic targets of the Ministry of Health. For this reason, the MMM initiative has had strong support from the national and regional health authorities since the country was involved in the MMM initiative. Additionally, the first author of this article (F.L.) and MMM coordinator is a member of the International Society of Hypertension and President of the Chilean Society of Hypertension.

Methods

The MMM19 activities were launched by the Minister of Health, together with the Chilean Society of Hypertension and the Chilean Society of Cardiology at the beginning of May. They were promoted in the main TV channels, radio, newspapers, and internet media in order to inform the community about the importance of BP measurement and to invite them to attend the participating sites to measure their BP. MMM19 in Chile was a cross-sectional survey that included adults (18 years of age or older) who ideally had not had their BPs measured in the past year. Most of the sites were primary care outpatient clinics of the public health sector. In addition, private clinics, universities, and clinical research sites participated. Measurements were done mainly during working days (98%), during the whole month of May.

On the day of the measurements, participants completed a questionnaire about demographics, lifestyle, environmental factors, and estimated weight and height. Measurements were performed by personnel who had formal training in the procedure, as paramedics, nurses, or health careers students, and received study training materials about how to fill in the registration forms and BP measurement using standard procedures. Measurements were performed following international guidelines, in a seated position. Ideally, each participant had his or her BP measured three times. However, when the first measurement was normal, they often had only one measurement. Automatic devices mainly produced by from OMRON were used for BP measurement. Blood pressure was calculated from the mean of the 2nd and 3rd readings. Mean BPs were standardized for age and sex according to the WHO world age standard population, with an assumed sex ratio of 1:1. Hypertension was defined as systolic BP (SBP) ≥ 140 mmHg or diastolic BP (DBP) ≥ 90 mmHg or based on receiving antihypertensive medication.⁴ Among those on treatment, controlled BP was defined as an SBP of < 140 mmHg and a DBP < 90 mmHg. Data were recorded mainly on spreadsheets or paper forms, which were later transferred to spreadsheets. The first author cleaned data locally. Data were analysed by the MMM project team. Multiple imputations were used to estimate the mean of the 2nd and 3rd BP readings when they were not recorded and analysed according to the global data as described previously.⁴ No funding was available.

Results

The number of participants in MMM19 was 6876 with a mean age of 46.9 ± 16.5 years, and 4231 of them were women (61.5%; see [Supplementary material online, Table S1](#)).

Overall, 3979 participants had three measurements of BP recorded. The crude average SBP and DBP for the mean of the 2nd and 3rd measurements were 124.6 and 77.1 mmHg, respectively. The average SBP and DBP for measurements one, two, and three was 126.6, 124.9, 123.9 and 77.9, 77.1, 76.8 mmHg, respectively. After imputation, the age and sex standardized mean BP was 123.8/77.0 mmHg. The number of participants with hypertension after imputation was 2434, representing 35.4% of the total participants, 1603 (65.9%) of whom were aware of having hypertension, and 60.1% of whom were receiving antihypertensive medication. A total of 972 (17.9%) out of the 5414 participants who were not receiving treatment had SBP and/or DBP equal or higher than 140 or 90 mmHg, respectively, and were therefore considered potential hypertensives. They were referred to their health provider and received an educational leaflet with recommendations about diet and lifestyle changes. Among the 1462 subjects, receiving antihypertensive medication 836 (57.2%) had their BP controlled. Finally, 34.4% of the total number of hypertensives had their BP controlled ([Table 1](#)).

Awareness of having hypertension and receiving antihypertensive medication was associated with higher SBP and DBP. History of diabetes, previous myocardial infarction, and stroke was not associated with higher SBP. However, smoking, alcohol intake, and history of hypertension in pregnancy were significantly associated with increased SBP and DBP. Compared with those with normal weight, obese participants had a significantly increased SBP and DBP of 5.7 and 4.3 mmHg, respectively, and overweight participants had a significantly increased SBP and DBP of 2.1 and 2.2 mmHg, respectively ([Supplementary material online, Figure S1](#)). The measurement day of the week did not influence SBP and DBP mean values.

Discussion

Compared with MMM17² which was mainly restricted to the ninth region of the country, MMM18³ and now MMM19 had a

Table 1 Summary of results

| Condition | n | Present | Absent | % |
|------------------------------------|------|---------|--------|------|
| Hypertension | 6876 | 2434 | 4442 | 35.4 |
| Hypertension awareness | 2434 | 1603 | 831 | 65.9 |
| Hypertensives on treatment | 2434 | 1462 | 972 | 60.1 |
| On treatment with controlled BP | 1462 | 836 | 626 | 57.2 |
| Controlled BP in all hypertensives | 2434 | 836 | 1598 | 34.4 |

BP, blood pressure.

higher proportion of its centres distributed across the country. The National Health Survey of 2016-17 in Chile estimated a national prevalence of hypertension of 27.6%, and the awareness, treatment, and control rate were 68.7%, 60.0%, and 33.3%, respectively.³ The higher hypertension prevalence observed in MMM19, 35.4%, can be explained by the higher minimum age and sampling of MMM, performed mainly in health facilities, compared with the National Survey that included a random sample of the population. Surprisingly, the percentage of hypertensives with controlled BP (<140/90 mmHg) is very similar in the MMM17, MMM18, and MMM19 surveys and that estimated from the National Health Survey: 32.5%, 34.8%, 34.4%, and 33.3% respectively.

After 3 years of Chile being part of the MMM initiative this monthly activity, including both the media advertising and BP screening have become part of the routine activities in the Ministry of Health. It is promoted in the regular communications between the Ministry offices and the health facilities in the country and the MMM18 results were presented in a Pan American Health Organization (PAHO) regional meeting regarding hypertension care.

Supplementary material

[Supplementary material](#) is available at *European Heart Journal Supplements* online.

Conflict of interest: none declared.

References

1. Chilean Health Survey. https://www.minsal.cl/wp-content/uploads/2017/11/ENS-2016-17_PRIMEROS-RESULTADOS.pdf (7 December 2020).
2. Lanas F, Garcia MS, Paccot M, Pena J, Torres P, Beaney T, Ster AC, Poulter NR, Xia X. May Measurement Month 2017 in Chile-Americas. *Eur Heart J Suppl* 2019;21:D34-D36.
3. Lanas F, Garcia MS, Paccot M, Peña J, Torres P, Beaney T, Ster AC, Poulter NR, Xia X. May Measurement Month 2018: an analysis of blood pressure screening results from Chile. *Eur Heart J Suppl* 2020;22:H37-H39.
4. 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, Steckelings UM, Tomaszewski M, Unger T, Wainford R, Wang J, Williams B, Poulter NR, MMM Investigators. May Measurement Month 2019: the global blood pressure screening campaign of the International Society of Hypertension. *Hypertension* 2020;76:333-341.