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

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KEYWORDS

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Hypertension is highly prevalent in Chile. The National Health Survey 2016-17 reported a 27.6% prevalence, 68.7% awareness, and 33.3% of hypertensives had controlled blood pressure (BP). May Measurement Month (MMM) is a global initiative aimed at raising awareness of high BP and to act as a temporary solution to the lack of screening programmes worldwide. A cross-sectional survey of volunteers aged ≥ 18 years old was carried out in May 2018. Blood pressure measurement, the definition of hypertension, and statistical analysis followed the MMM protocol. Ninety-four sites participated, most of them from the Public Health System outpatient clinics distributed along the country. In addition, universities, clinical research sites, and private clinics participated. Hypertension was diagnosed as mean systolic BP ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg or receiving antihypertensive medication. Overall 9344 individuals were screened. After multiple imputation, hypertension prevalence was 29.2%, of which 64.0% were aware of their condition. Of those aware of their hypertension diagnosis, 87.7% were receiving antihypertensive medication and 56.1% of the total number of hypertensives were on antihypertensive medication. Moreover, 15.3% of the participants who were not receiving treatment were considered potential hypertensives identified in the MMM18. MMM18 was one of the largest BP screening campaigns performed in Chile. It demonstrated a high prevalence of hypertension with one-third of these individuals having controlled BP. The high percentage of persons untreated or with uncontrolled hypertension while on pharmacologic treatment suggests that systematic screening programmes may be a useful tool to improve hypertension control in Chile.

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Introduction

Cardiovascular diseases are the lead causes of death in Chile, representing 27.1% of the total mortality in 2016. Even though myocardial infarction is the first cause of specific death in Latin America,¹ stroke is the first in Chile.² In 2016, stroke and myocardial infarction annual mortality rates were 46.4 and 44.8 per 100 000 inhabitants, respectively, with a significant predominance in the male population for stroke 55.1 vs. 34.8 per 100 000 inhabitants.² Hypertension is a major determinant of these cardiovascular causes of death: myocardial infarction, stroke, and heart failure. The hypertensive disease death rate is 32.5 per 100 000 inhabitants—more predominant in females at 37.5 vs. 27.3 per 100 000 inhabitants in men.² Myocardial infarction incidence was 74.4 per 100 000 inhabitants in the period 2001–07³ and stroke incidence was 140.1 per 100 000 between 2000 and 2002.⁴

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 similar prevalence in men and in women.⁵ Baseline data of the PURE cohort, in the 9th region of Chile, reported a prevalence of hypertension of 46.6% in individuals between 35 and 74 years old.⁶ Baseline CESCAS cohort, in the city of Temuco in individuals from 35 to 70 years reported a prevalence of hypertension of 39.7%.⁷ This prevalence is highly influenced by age and educational level, reaching 73.3% in those older than 64 years and 56.8% in those with <8 years of education.⁵ Comparing the results of the National Health Survey 2009–2020 with the one conducted in 2016–17 a slight improvement in hypertension knowledge is observed: from 66.5% to 68.7%. However, the treatment rate increased from 52.5% to 60.0% and the proportion of individuals with controlled blood pressure (BP) (<140/90 mmHg) increased from 17.1% to 33.3%.⁵

Chile participated in the May Measurement Month (MMM)17 initiative with 67 sites participating. Most screening sites were National Public Health System outpatient clinics, mainly in the 9th region of the country. Overall, 4754 individuals were screened during MMM17. After imputation 24.2% had hypertension. Among individuals not receiving antihypertensive medication 15.3% were hypertensives, and from those treated with antihypertensive medication, 500 individuals, 32.5% had uncontrolled BP.⁸

In Chile, improving BP control rate among pharmacologically treated patients is a priority in 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

This cross-sectional survey included adults (≥ 18 years) who ideally had not had their BPs measured in the past year. Ninety-four sites participated, with an average number of 100 participants per site. Most of the sites were primary care outpatient clinics of the public health sector, with approximately half of them located in the 9th region of the country. In addition, the Chilean Society of Cardiology, three private clinics, two universities, and four clinical research sites participated. Measurements were done mainly during working days, during the whole month of May. The activities were launched by the Minister of Health and were advertised in the main TV channels, radio, newspaper, and internet media to promote the community participation. Personnel involved in the measurements had formal training, as paramedics, nurses, or health careers students, and received study training material about how to fill in the registration forms and BP measurement using standard procedures. No funding was available.

Each participant had their BP intended to be measured three times, in a seated position, mainly with OMRON automatic devices. They also received a questionnaire about demographic, lifestyle, environmental factors, and estimated weight and height. 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 along 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.⁹ Among those on treatment, controlled BP was defined as a BP of <140/90 mmHg. Data were recorded mainly on spreadsheets or paper forms, and later transferred to spreadsheets. It was cleaned locally by the article's first author. Data were analysed by the MMM project team. Multiple imputation was used to estimate the mean of the 2nd and 3rd BP readings when they were not recorded and analysed according to the standard plan.¹⁰

Results

The number of participants was 9344 with a mean age of 46.7 years old (SD 16.4), and 5754 of them women (61.6%) (see [Supplementary material online, Table S1](#)). Overall, 4185 participants had three measurements of BP recorded. Crude average mean SBP and DBP for the three measurements were 125.3 and 77.3 mmHg, respectively; the average for measurements 2 and 3 was 124.5 and 77.1 mmHg, respectively. After age and sex standardization, they were 122.6 and 75.9 mmHg. After imputation the number of participants with hypertension were 2726 (29.2%) of the total participants, 1744 (64.0%) of them were aware of having hypertension. Of those aware of being hypertensive, 1530 (87.7%) were receiving antihypertensive medication and 56.1% of the total number of hypertensives were on antihypertensive medication. A total of 1196 (15.3%) out of the

7814 participants who were not receiving treatment had SBP and/or DBP equal or higher than 140 or 90 mmHg, respectively, and were considered potential hypertensives identified in the MMM18. They were referred to their health provider and received an educational leaflet with recommendations about diet and lifestyle changes.

Among the 1530 subjects receiving antihypertensive medication 948 (62.0%) had their BP controlled. Finally, 34.8% of the total number of hypertensives had their blood controlled. In those patients, the mean SBP and DBP were 129.1 and 79.3 mmHg. Awareness of having hypertension and receiving antihypertensive medication was associated with higher SBP and DBP, and a history of diabetes was associated with higher SBP. However, smoking and alcohol intake was not significantly associated with BP. Compared with those with normal weight, obese participants had a significantly increased SBP and DBP of 5.7 and 3.5 mmHg, respectively and overweight participants had a significantly increased SBP and DBP of 2.4 and 1.1 mmHg, respectively (see [Supplementary material online, Figure S1](#)).

Discussion

MMM18 in Chile demonstrated that 29.2% of those screened were hypertensive. Among the hypertensive participants, 56.1% were receiving medication to control BP, but only 62.0% of those receiving medication had controlled BP and 582 (38%) had uncontrolled BP. A total of 1196 (15.3%) participants were identified as potential new diagnoses of hypertension. Compared with MMM17,¹⁰ which was mainly restricted to the 9th region of the country, MMM18 had a broader national coverage, being launched by the Minister of Health, accompanied by the presidents of the Chilean Society of Hypertension and the Chilean Society of Cardiology with wide television and newspaper coverage. The participating sites were distributed along the country and the number of participants doubled.

Given the non-representative selection of recruiting sites, most of them being part of health services facilities, the high level of concordance observed between these results and the National Health Survey of 2016-17⁵ is surprising. The Chilean National Health Survey is a representative household survey with a stratified multistage probability sample of 6233 participants over 14 years old. With the same definition for hypertension as MMM17 the national prevalence was 27.6%, strongly influenced by age and education level, and the awareness, treatment, and control rate were 68.7%, 60.0%, and 33.3%, respectively.⁵

The characteristics of our participant sites, mainly health facilities had strengths and weakness. The major strengths include the nation-wide participation, well-trained staff for the BP measurement, the availability of

automatic BP devices, and the facility for referring individuals with elevated BP to their health provider. The major weakness is that this strategy does not help to identify the presence of possible hypertension in individuals who are not attending health facilities, due to work location or rurality.

Supplementary material

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

Conflict of interest: none declared.

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