

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

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In 2015, arterial hypertension was responsible for 18.1% of the total deaths in Mexico and its mortality rate has increased to 29.9% in the last 6 years. It is currently the main risk factor for preventable premature deaths of adults in the country. Good quality epidemiological information is the first step to improve health services. May Measurement Month 2018 (MMM18) in Mexico is an opportunistic survey, which follows the previously published methodology. MMM18 included screening 10 139 participants, 2187 (21.6%) of whom were classified as having hypertension. Of these, 42.0% were aware of the condition before measurement, and 38.0% were on medication, of which 66.5% were controlled. Hence, of all hypertensive patients, 25.3% were controlled (<140/90 mmHg). MMM18 in Mexico provides complementary data to the existing information on arterial hypertension in the country and helps to increase the visibility of hypertension: a priority health problem.

Introduction

Globally cardiovascular disease accounts for 17.8 million deaths in 2017, which represents nearly one-third of the total causes of death, approximately 75% of these premature deaths occur in low- and middle-income countries, including Mexico.¹ Of these complications, high systolic blood pressure (BP), accounts for 10.4 million deaths and 218 million disability-adjusted life years lost every year.²

Mortality from cardiovascular disease in Mexico has increased by 35.9% in the last 10 years (2007-17): ischaemic heart diseases increased by 60.4%, reaching in 2017 an age-standardized rate (ASR) of 1531.4 per 100 000, and stroke increasing in the same period by 35.9%, with an ASR in 2017 of 594.8 per 100 000. Hypertension is in Mexico the fourth biggest risk factor that drives most combined death and disability and has increased by 49.8% between 2007 and 2017.³

The May Measurement Month (MMM) project represents for Mexico not only the opportunity to strengthen the visibility of hypertension among the population and health decision-makers but also to provide information on the state of the problem in the country by comparing the results with previous surveys.

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In 2017, the first version of the survey (MMM17) was carried out, and Mexico participated with a small group of medical researchers working in private practice. For MMM18, the number of participants was significantly increased, with the incorporation of the survey of the Mexican Alliance for a Healthy Heart, which combines the leading Cardiological associations of the country.

Methods

MMM18 in Mexico, is an opportunistic survey, which follows the methodology previously published.⁴ Blood pressure measurements were carried out in various locations including hospitals, clinics, and pharmacies. The survey was performed by voluntary doctors or nurses trained in the measurement of BP.

Authorization for the collection and use of the results was asked orally to the participants, without writing down personal identification data, in order to keep the survey within the Mexican Federal Law on Protection of Personal Data Held by Private Parties (*Ley Federal de Protección de Datos Personales en Posesión de Los Particulares*).⁵ Information material translated into Spanish was distributed to the participants. For BP measurements, validated semi-automatic measuring equipment of the Omron brand was used and the pressure measurement guidelines contained in the Official Mexican Standard for the Management of Arterial Hypertension (NOM-030-SSA2-2017)⁶ were followed. The definition of hypertension used was systolic BP ≥ 140 mmHg or diastolic BP ≥ 90 mmHg or if the participant declared to be on treatment for hypertension. The mean of the 2nd and 3rd BP measurements was used for the analyses. Where this was not available, multiple imputation was used to impute the missing reading, based on the global data.⁴ Data were analysed centrally by the MMM project team.

Results

The total number of participants screened in Mexico was 10 139, the demographic characteristics of the sample can be seen in [Supplementary material](#) online, [Table S1](#). Participants included were 61.7% female, 38.8% were of a mixed ethnicity, mean age was 44.7 ± 15.7 years, and mean body mass index was 27.6 ± 4.7 kg/m² (see [Supplementary material](#) online, [Table](#)).

After multiple imputation, 2187 (21.6%) were classified as hypertensive, of which 918 (42.0%) were aware and 832 (38.0%) were on medication. Of those on medication, 553 (66.5%) were controlled and the overall proportion of hypertensive patients that were controlled was 25.3%. Of those not taking antihypertensive medication, 1355 (14.6%) were found to have raised BP.

Based on linear regression models, adjusted for age and sex (with an interaction) and antihypertensive medication, participants who were overweight or obese (vs. healthy weight) were associated with higher systolic and diastolic BP measurements. Conversely, participants who were

underweight (vs. healthy weight) were associated with lower systolic and diastolic BP measurements ([Supplementary material](#) online, [Figure S1](#)).

As can be seen in [Supplementary material](#) online, [Figure S2](#), systolic BP increases with age in a constant manner, while diastolic BP increases in a similar manner until an age close to 40 years in which a plateau is established. Also, a slow progressive decrease begins to be noticed in diastolic BP around 60-65 years, which implies that the differential pressure or pulse pressure increases from the age of 40 years.

Discussion

It is interesting to compare the data of this opportunistic survey with those of the three probabilistic surveys previously conducted in Mexico.

Three probabilistic national health surveys, with information on BP measurement, have been developed in Mexico ENSA-2000 (National Survey of Health 2000),⁷ ENSANUT-2012 (National Survey of Health and Nutrition-2012),⁸ and ENSANUT-MC-2016 (National Survey of Health and Nutrition-2016).⁹ The prevalence of hypertension decreased from 30.5% in 2000 and 31.6% in 2012 to 25.5% in 2016, probably due to the use in this latest survey of automated BP equipment. The proportion of hypertensives' awareness has been increasing, being 39%, 50%, and 60% in the three subsequent surveys (2000, 2012, and 2016). The proportion of people receiving treatment has also been increasing from 47% in 2000 to 74% in 2012 to 79.3% in 2016. Furthermore, the proportion of people who reach the goal of $<140/90$ mmHg has also been increasing, being 14.6%, 51.0%, and 59.7% in each of the surveys.

There are fundamental methodological differences between MMM18 Mexico and the National Health Surveys, which in principle do not make them comparable, since the latter are probabilistic and MMM18 is opportunistic; however, they were carried out in very similar populations and especially in comparison with ENSANUT-MC 2016. The sample size is similar, similar geographical areas were covered, BP measurements were made with devices of the same type and with the same technique.

The prevalence of hypertension in MMM18 (21.6%) is similar, although slightly lower than that registered in ENSANUT-MC 2016 (25.5%) which may reflect differential sampling, also may in part reflect that the use of oscillometric devices shows lower figures than those taken with mercury devices that were used in ENSA-2000 and ENSANUT-2012. The proportion of hypertensives aware (42%) and the proportion of hypertensives on medication in MMM18 (38%) are low and are more similar to those registered in ENSA-2000 (39% and 47%, respectively).

It is noteworthy that the prevalence of obesity in our sample (20%) is lower than that reported in ENSANUT-MC 2016 (33%), which is the officially accepted figure in Mexico. However, the proportion of diabetics is higher (11.3% in ENSANUT-MC 2016 vs. 9.4% in MMM18). It is important to note that in both surveys, the diagnosis of diabetes

was based only on a simple question: e.g. 'Do you have diabetes?'

In conclusion, MMM18 in Mexico provides complementary data to the existing information on arterial hypertension in the country and helps to increase the visibility of this priority health problem: arterial hypertension.

Supplementary material

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

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