

## Supplementary Material:

# Hypertension Awareness, Treatment and Control in Mexico: An Opportunistic Medical Student-led Blood Pressure Screening Campaign – A Cross-Sectional Study

The Mexican Association of Medical Students Blood Pressure Reading, 2019. Study Protocol



### Executive Summary

In May 2017 and 2018, the International Society of Hypertension (ISH) performed a global BP awareness campaign including more than 2.7 million people from more than 100 countries to raise hypertension awareness.<sup>1,2</sup>

Hypertension is defined as the sustained elevation of the pressure within the blood vessels. In Mexico, the cutoff values to diagnose hypertension are 140/90 mmHg and above.<sup>3</sup>

The aim of this protocol is to conduct a national opportunistic blood pressure (BP) detection campaign in Mexico to raise awareness and estimate control of those screened who were detected as hypertensive.

### Background

Hypertension is the modifiable risk factor to which more deaths are attributed around the world. In Mexico, the National Health and Nutrition Survey (ENSANUT) 2016 showcased that around 30% of the population above 20 years of age lives with hypertension, and roughly half of these people do not know about their condition. Another worrying figure is that 65% of people with hypertension do not adhere to anti-hypertensive treatment.<sup>3</sup>

Several strategies have been implemented globally and nationally to fight hypertension—one of the most recent and ambitious ones is the May Measurement Month (MMM), created by the ISH.<sup>1,2</sup> The MMM is a cross-sectional study which aims to raise awareness and determine

prevalence, control and associations related to elevated BP.<sup>1,2</sup> In 2018, our national medical students' association (AMMEF) performed a longitudinal pilot study across Mexico about knowledge and control of hypertension. However, the methodological complexity of that project has deterred its analysis and publication.

### Justification

Social and economic consequences derived from hypertension have been devastating to health systems around the world.<sup>4</sup> There is a gap in hypertension awareness and control in our country.<sup>5</sup> And more information is needed about the characteristics of people who live with uncontrolled hypertension in Mexico.

As previously mentioned, our association has tried to contribute in increasing the knowledge about this phenomenon. However, study designs previously selected for this purpose were too ambitious to be carried nationally by medical students and no background information was obtained prior its implementation to justify the need of such type of study.

This is the reason why a cross-sectional design is best suited to explore issues that could later be studied through a longitudinal methodology.

### Study Aims

#### General Aim

To perform an opportunistic blood pressure reading campaign in the Mexican population to raise awareness and study control of hypertension.

**Specific Aims**

- To measure BP in a population obtained by convenience sampling around Mexico
- Apply the ISH MMM Questionnaire to determine associated factors
- Raise awareness of hypertension
- Raise awareness of the importance of knowing one’s BP numbers through printed materials and talks at screening sites
- Estimate the prevalence of hypertension, the proportion of controlled and uncontrolled individuals within the study population
- Compare hypertension prevalence, awareness, and control of participants between states of Mexico

**Methodology**

*Study design*

A cross-sectional study based on an opportunistic screening campaign.

*Sampling*

Convenience sampling will be the method to include participants in the study, given the characteristics of an opportunistic screening campaign. We have not calculated a sample size to reach statistical power.

*Temporality*

All training about BP measurement and questionnaire application should be carried out before June 10, 2019. The first phase of screening at hospitals and clinics waiting rooms and entrance will be performed from June 10 to August 9, 2019. The second phase of screening in public spaces will be carried out from September 23 to October 21, 2019, in the same cities as the hospital/clinic screenings were performed.

*Territory*

This is protocol is applicable throughout Mexico.

*Inclusion criteria*

- People older than 18 years of age
- Informed consent by participants conforming to local dispositions (an informed consent form will be provided as a document and digital to local screening teams)

*Study Steps*

- Students should give ample information about the study to participants as well as obtain informed consent to participate. All information (including written material) should be given in a clear and easy to understand language.
- Data collection about the screening site and basic demographic information
  - All data must be collected and registered before BP readings.
  - If using the digital format (see Questionnaire below), data will not be changed and therefore should be registered only one time
  - Indispensable information includes: City and state, address of screening site, date, participant’s age, sex, at least 1 BP reading of systolic blood pressure and diastolic blood pressure, and heart rate.
- Other variables that should be registered when available:
  - Screening site identification and/or e-mail from the center at which is screening took place
  - Type of screening site: hospital/clinic, pharmacy, workplace, open public space, closed public space, home, other
- Students must apply the questionnaire to all screenees according to training, and after completion perform the BP reading.

**Measurements by the International Society of Hypertension Questionnaire**

- The Questionnaire should be filled into the digital format or using the official printed version
  - When was the last time you had your blood pressure read? Never / >12 months ago / <12 months ago
  - Have you been diagnosed with hypertension/high blood pressure by a health professional? Yes / No
  - Currently, are you taking any medication/prescription for hypertension/high blood pressure? Yes / No / Does not know, if YES:
    - How many drugs are you taking for your blood pressure? 1 / 2 / 3 / 4 / 5 or more
  - Are you taking a statin (give examples)? Yes / No
  - Are you taking aspirin (give alternative names)? Yes / No
  - If WOMAN: Are you pregnant? Yes / No
    - Has your blood pressure increased in this or a previous pregnancy? Yes / No
  - Self-declared ethnic origin
  - Right now, are you fasting? Yes / No
  - Do you have diabetes or have been diagnosed with diabetes by a doctor? Yes / No / Does not know
  - Do you smoke or use any tobacco product? Yes / No
  - Do you consume alcohol? Never or almost never / 1-3 times per month / at least 1 time per week
  - Have you had a heart attack? Yes / No / Does not know
  - Have you had a stroke? Yes / No / Does not know
  - Height (measured at screening site [preferably] or declared if not possible to measure, approximate if necessary)
  - Weight (measured at screening site [preferably] or declared if not possible to measure, approximate if necessary)
- Systolic blood pressure (1-3 readings)
- Diastolic blood pressure (1-3 readings)
- Heart rate (1-3 readings)
- Name of the brand and model of the device(s) used to perform BP reading

*Blood pressure readings*

- All students must use the method described in: [https://youtu.be/9kesU\\_3\\_7As](https://youtu.be/9kesU_3_7As) to perform BP readings.
- BP should preferably be measured by an automated electronic device or, if this is not available, a conventional sphygmomanometer using a stethoscope can be used.
  - If a sphygmomanometer is used, the first and fifth Korotkoff sounds (the appearance and disappearance of sounds) will be recorded as the systolic and diastolic BP.
- BP should be measured on the upper-arm
- Ensure that the correct size of arm cuff is used
  - For arms with circumference < 32 cm, use regular cuff
  - For arms with circumference 32-42 cm, use large cuff
  - For arms with circumference >42 cm, use extra-large cuff
  - For arms with circumference <20cm use pediatric cuff
  - The cuff should be placed at the heart level
- The screened subjects’ arm, being used for the measurement, should rest comfortably on a table
- BP should be measured on one arm only, preferably left
- Prior to measurement:
  - The participant should be seated with their backs supported, legs uncrossed and feet flat on the ground for 5 min (during which time the Questionnaire should be applied)

- Participants should not have smoked immediately before or during the measurement and should not talk during and between BP measurements.
- Three (3) BP readings should be taken with 1 min between readings and recorded
- For each BP reading, the automated BP devices also provide data on heart rate, and this information should also be captured
- If the auscultatory method/sphygmomanometer is used, the heart rate should be established during the 1 minute after each BP reading, and also recorded

#### Definitions

- Hypertension
  - Hypertension was defined as a systolic blood pressure (SBP)  $\geq 140$  mmHg or a diastolic blood pressure (DBP)  $\geq 90$  mmHg in at least two of the readings, OR
  - Taking at least one anti-hypertensive agent.
- Unaware hypertensive
  - Those that satisfy the hypertension definition at screening but did not have a previous diagnosis or treatment.
- Controlled hypertensive
  - Those with normal BP values at screening but with a previous diagnosis or treatment for hypertension.
- Uncontrolled hypertensive
  - Those that complied hypertension criteria at screening and had a diagnosis and/or treatment for hypertension.

#### Materials to be used at screening site

- Mobile devices with Internet access to the digital Questionnaire or printed copies of the Questionnaire (MMM\_Cuestionario.pdf)
- Stethoscope
- Sphygmomanometer (aneroid)
- Digital BP reading devices
- Calibrated body weight scales

- Calibrated stadiometer
- Printed copies of informed consent (InformedConsent\_Example.docx)
- Tables, chairs and tents as necessary

#### Recommendations that could be made to screened participants

- Reducing salt consumption
- Moderate ingests of alcohol
- Stop smoking
- Reducing caffeine consumption
- Reducing sugar and fat consumption
- Regular physical activity at least 30 minutes a day, almost every day
- Consumption of fruits and vegetables every day
- Maintaining a normal body weight
- Avoiding stress as possible and having relaxation moments

#### Statistical analysis

- The sample size was not calculated, in aims to include the largest number of participants as attainable by the local screening teams.
- The analysis will include, but not be limited to:
  - Hypertension prevalence in study population
  - Proportion of unaware patients
  - Proportion of controlled patients
  - Proportion of uncontrolled patients
  - Relationship between associated factors and change in BP compared to non-hypertensive patients

#### Ethical issues

- Conforming to local dispositions. All participants should give their informed consent to be included, which will be recorded in the digital and/or printed forms.

All participants must receive a verbal and/or written explanation of the study.

## References

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