

# An analysis of blood pressure screening of 21 112 participants in Armenia: May Measurement Month 2018

Parounak Zelveian<sup>1,2\*</sup>, Avag Avagyan<sup>2</sup>, Arsen Minasyan<sup>2</sup>, Samvel Hayrumyan<sup>1,2</sup>, Svetlana Gourgenyan<sup>1</sup>, Zoya Hakobyan<sup>1,2</sup>, Hovhannes Kzhdryan<sup>1,2</sup>, Vahan Hakobjanyan<sup>2</sup>, Tsiala Ustyan<sup>1</sup>, Heggine Gharibyan<sup>1</sup>, Arevik Melkonyan<sup>1</sup>, Siranush Aroyan<sup>1</sup>, Susanna Vatinyan<sup>1</sup>, Thomas Beaney<sup>3,4</sup>, Anca Chis Ster<sup>3</sup>, and Neil R. Poulter<sup>3</sup>

<sup>1</sup>Institute of Cardiology Named After L.A. Hovhannisyan, P. Sevak 5, Yerevan 0014, Armenia;

<sup>2</sup>Armenian Medical Association, H. Tumanyan 38/9, Yerevan 0002, Armenia;

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

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

## KEYWORDS

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Elevated blood pressure (BP) is a growing burden worldwide and is the leading cause of mortality and disability-adjusted life years all over the world. May Measurement Month (MMM) is a global initiative aimed to raise awareness of high BP and to act as a temporary solution to the lack of screening programmes worldwide. An opportunistic cross-sectional survey of volunteers aged  $\geq 18$  was carried out in May to July 2018. Blood pressure measurement, the definition of hypertension (HTN) and statistical analysis followed the standard MMM protocol. The study was conducted in public areas (17 sites in Yerevan and 22 in regions), both indoor and outdoor, as well as in 78 primary care centres. A total of 21 112 individuals were screened during MMM18, of which 20 732 had three BP measurements available. The mean age of screened individuals was  $46.2 \pm 17.3$  years, 57.8% were female. At the time of screening, 26.1% were on antihypertensive medication. After imputation, the percentage of participants with HTN was 38.7%, and 76.7% of them were aware of their high BP. Of participants receiving treatment, 47.1% had a controlled BP. MMM18 was the largest BP screening campaign undertaken in Armenia. We found that the proportion of HTN is substantial in Armenia, which may be a vital contributor to the growing burden of non-communicable diseases. Our results also suggest that untreated HTN is common and when treated still not adequately controlled in Armenia. The current situation, with an insufficient control rate of HTN, must be changed as soon as possible.

## Introduction

According to the National Health Information-Analytical Centre, the mortality burden due to the most prevalent

non-communicable diseases (NCDs) comprised 81.4%, with cardiovascular diseases (CVDs) being the lead cause (55.6%). Premature (under 65) mortality represents 26.6% of total mortality and mirrors the overall NCD mortality structure, which negatively impacts the country's socio-economic development.<sup>1</sup>

\*Corresponding author. Tel: +374 10 288550, Fax: +374 10 288502, Email: zelveian@hotmail.com

Elevated blood pressure (BP) is a growing burden worldwide and is the leading cause of mortality and disability-adjusted life years. It is an enormous public health problem contributing to the current pandemic of CVD.<sup>2,3</sup> However, high BP is a modifiable risk factor and the prevention or treatment of hypertension (HTN), is of utmost importance to improving the still poor statistics of mortality. Unfortunately, awareness is reportedly only about 50% among those with HTN, and control rates in treated hypertensive patients remain low, especially in low-income countries.<sup>4</sup> As a result, the effective control of HTN has become a priority for global health policy and, with a growing interest in the prevention and control of NCDs, health care systems must deliver appropriate interventions for tackling high BP.

May Measurement Month (MMM) is a global initiative, initiated by the International Society of Hypertension (ISH), aimed at increasing awareness of high BP and to act as a temporary solution to the lack of screening programmes worldwide.<sup>5</sup> In response to the call of the MMM programme of the ISH and the Lancet Commission on Hypertension,<sup>6</sup> to improve screening and awareness, Armenia joined the MMM initiative in 2017.

MMM17 was the largest screening campaign of any cardiovascular risk factor ever done in the Armenian population.<sup>7</sup> At the time of MMM17 initiative about 33.9% of screenees had HTN, and 52.9% of them were on antihypertensive medication. Of those treated, 77.0% were uncontrolled.<sup>7</sup> So every campaign that aims at raising awareness regarding BP and improving detection and controlled rates in our country has exceptional importance and is a vital step in fighting this growing epidemic. We joined the MMM 2018 (MMM18) initiative, as it was an excellent opportunity, not only to increase public awareness about high BP as one of the critical cardiovascular risk factors, but also to update the national data on high BP.

## Methods

This cross-sectional survey was conducted among the adult population ( $\geq 18$  years), following the protocol provided by ISH.<sup>8</sup> All ethical approvals were received according to local requirements of conducting cross-sectional studies from the ethical committee of the National Institute of Health. The campaign was promoted internationally by ISH and locally by the Armenian Medical Association and Armenian Cardiologists' Association. The study co-ordinator was Professor Parounak Zelveian, and the total duration of the study was 75 days starting from the middle of May.

The study was conducted at 39 sites in public areas (17 in Yerevan and 22 in regions), both indoor and outdoor, as well as in 78 primary and secondary health care centres. Eighty volunteers were engaged in the study for the public part, and 105 health care specialists were involved in health care centres. All volunteers were trained for basic knowledge about HTN and measurement techniques.

Screenees were recruited using posters and banners, distribution of flyers, press conference, interviews on television, advertisements in online and printed media, and as well as advocacy on social media. The recruitment of the

screenees was volunteer-based, and they were asked to participate in the study after a short introduction about the program and taking verbal informed consent.

Three measurements of BP were conducted in a sitting position, with 1-min intervals between each measurement, mostly with Omron and A&D automated devices. Blood pressure was calculated from the mean of the 2nd and 3rd readings, and HTN was defined as a systolic BP (SBP)  $\geq 140$  mmHg or a diastolic BP (DBP)  $\geq 90$  mmHg, or those on antihypertensive treatment. Among those treated, controlled BP was considered as a BP  $< 140/90$  mmHg. Multiple imputation according to the global data was used to estimate the mean of the 2nd and 3rd reading where missing. A questionnaire was used to collect information on demographics, lifestyle, and environmental factors. Data collection, cleaning and transfer, as well as analysis were done centrally by the MMM project team, as described previously.<sup>8</sup>

## Results

A total of 21 112 individuals (57.8% females) with mean age was  $46.2 \pm 17.3$  years were screened. In total, 2406 (11.4%) participants reported having diabetes, 1970 (9.3%) had a history of myocardial infarction, and 948 (4.5%) had a history of stroke. In total, 5861 (27.8%) respondents were current smokers, 2032 (9.6%) reported alcohol consumption once or more per week. The mean body mass index of respondents was  $26.3 \pm 5.0$  kg/m<sup>2</sup>, 8362 (39.6%) of them has a 'healthy weight' (Supplementary material online, Table S1).

Of 20 732 respondents with three BP readings, BP decreased on average by 4.2/2.4 mmHg between the 1st and 3rd readings. The mean values of the 2nd and 3rd readings were 125.8/80.3 mmHg.

At the time of screening, 26.1% (5513) were on antihypertensive medication. After imputation, 8179 participants had HTN (38.7%), and 6278 (76.7%) of them were aware of their high BP. The number of participants receiving treatment and with controlled BP was 2595 (47.1% of 5513). Of all those with HTN, 31.7% had controlled BP.

After adjustment for age and sex, statistically significantly higher SBP and DBP were apparent in groups on BP-lowering treatment, in patients with previously diagnosed HTN, among smokers, persons with alcohol intake once or more per week, among obese and overweight participants. A higher level of SBP was also observed in people with a previous history of stroke (Supplementary material online, Figures S1-S3).

## Discussion

According to MMM18 screening in the Armenian population, 8179 (38.7%) participants were found to have HTN and two-thirds of them were on antihypertensive medication. Of those treated, just over half were uncontrolled and only one-third of all hypertensives achieved the goal of BP control. According to MMM17 screening,<sup>8</sup> the prevalence of HTN was 33.9%, and the proportion of participants with HTN (including those on treatment) in MMM18 was higher than that in previous national estimates.<sup>9-11</sup>

## Conclusion

In conclusion, we found a high proportion of participants with HTN in Armenia, which may be a vital contributor to the growing burden of NCDs. Our results also suggest that treated HTN is still not adequately controlled in Armenia, and the current situation with an insufficient control rate of HTN must be changed as soon as possible. The high percentage of newly diagnosed and the identification of uncontrolled HTN despite pharmacological treatment reinforce the importance of the MMM annual event as a reasonably inexpensive tool in Armenia to improve public awareness in the general population, and potentially among health policymakers, and to improve the prevention of major adverse cardiovascular events. We believe that further projects, which drive awareness on high BP, can help to get more people identified and controlled. It is hoped that MMM should continue on an annual basis as long as large numbers of people with increased BP can be identified and treated effectively. The results we have obtained support the belief that population-based campaigns provide a significant contribution to spread awareness, stimulate curiosity and collect data in large numbers of individuals in Armenia over a relatively short time frame.

## Supplementary material

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

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