May Measurement Month 2019: an analysis of blood pressure screening results in the Philippines

Alejandro Bimbo F. Diaz1*, Deborah Ignacia David-Ona2, Leilani B. Mercado-Asis3, Alberto A. Atilano4, Gilbert C. Vilela5, Dolores D. Bonzon6, Carlos L. Chu7, Benjamin A. Balmores8, Rafael R. Castillo9, Thomas Beaney10,11, Jonathan M. Clarke, and Neil R. Poulter10; on behalf of the Philippine MMM19 Investigators

1Department of Neurosciences and Behavioral Medicine, University of Santo Tomas Hospital, Espana Street, Manila 1108, Philippines
2Division of Hypertension, Department of Medicine, University of the Philippines College of Medicine, Pedro Gil Street, Manila 1000, Philippines
3Section of Endocrinology and Metabolism, Department of Internal Medicine, Faculty of Medicine and Surgery, University of Santo Tomas, Espana, Manila 1108, Philippines
4Section of Cardiovascular Diseases, Department of Internal Medicine, Faculty of Medicine and Surgery, University of Santo Tomas, Espana, Manila 1108, Philippines
5Department of Adult Cardiology, Philippine Heart Center, East Avenue, Quezon City 0850, Philippines
6Section of Physiology, University of the Philippines College of Medicine, Pedro Gil Street, Manila 1000, Philippines
7Section of Neurology, Department of Internal Medicine, Manila Doctors Hospital, 667 United Nations Avenue, Ermita, Manila 1000, Philippines
8Section of Nephrology, Department of Internal Medicine, St Luke's Medical Center, E. Rodriguez Avenue, Quezon City 1102, Philippines
9Section of Cardiology, Department of Internal Medicine, Manila Doctors Hospital, 667 United Nations Avenue, Ermita, Manila 1000, Philippines
10Imperial Clinical Trials Unit, Imperial College London, Stadium House, 68 Wood Lane, London W12 7RH, UK
11Department of Mathematics, Imperial College London, Huxley Building, South Kensington Campus, London SW7 2AZ, UK

The Philippine Society of Hypertension (PSH) took part again in the annual May Measurement Month 2019 (MMM19) blood pressure (BP) measurement campaign to raise awareness of hypertension especially in those who are not aware of their condition. The MMM19 standard protocol designed by the International Society of Hypertension was used during screening. These included the collection of basic data on demography, lifestyle, and environmental factors. Standardized sitting BP measurements were taken two to three times, using an automated BP apparatus and were inputted either in the MMM19 app or data were recorded in paper form and manually transferred to Excel spreadsheets by encoders supervised by the PSH. A total of 89 941 participated through opportunistic convenience sampling. After multiple imputation, a total of 47 925 (53.3%) participants had hypertension (≥140/90 mmHg or on antihypertensive medication). Of this number, 31 151 (65%) were aware that they had high BP and 30 120 (62.8%) were on antihypertensive medications. Of the 30 120 participants on antihypertensive medications, only 18 373 (61.1%) had controlled BP.

*Corresponding author. Tel: +639178500676, Email: afdiaz@ust.edu.ph; bimbodiaz57@gmail.com

Published on behalf of the European Society of Cardiology. © The Author(s) 2021.
This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc/4.0/), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited. For commercial re-use, please contact journals.permissions@oup.com
trolled blood pressure (BP). Only 28.9% of all participants with hypertension had con-

Introduction

The national surveys conducted by the Food and Nutrition Research Institute in the last 2 years showed a decrease in the prevalence of hypertension to 19.2% (2018) and 17.5% (2019). This is a welcome development as hypertension remains to be a major risk factor for cardiovascular disease and stroke. The stroke death rate in the Philippines is one of the highest in South East Asia at 13.9% out of 130.85/100 000 total death rate.

The Philippine Society of Hypertension (PSH) led the May Measurement Month 2019 (MMM19) nationwide campaign in raising awareness of hypertension following the successful MMM17 and MMM18 campaigns it led in cooperation with the International Society of Hypertension (ISH). The key findings in the Philippines MMM18 showed that of 177 176 individuals screened, 39% were found to be hypertensive. Some also used aneroid sphygmomanometers as well. Two to three BP readings were obtained for each participant in the sitting position following standardized recommendation for obtaining BP measurements. Hypertension was defined as a systolic BP ≥140 mmHg or a diastolic BP ≥90 mmHg based on the mean of the 2nd and 3rd BP readings, or on antihypertensive medication. Data were either recorded directly to the MMM19 app or manually in paper printed protocols. The final cleaning and analysis of data submitted were carried out by the MMM19 central statistical team. For those participants missing either the 2nd or 3rd BP measurement (or both), multiple imputation using chained equations was used to estimate the missing reading based on global data, to provide better comparison across all participants.

Methods

The MMM19 campaign started with kick-off ceremonies at the Manila City Hall, which were attended by local government officers and volunteers who formed part of the screeners. In different provinces and cities, the PSH local chapters, government and non-government organizations, and pharmaceutical companies helped organize the MMM19 screening activities. The ethics approval obtained in the MMM18 project was valid to be used in the MMM19 project. All screening activities were performed after obtaining informed consent. The MMM19 screening was carried out in different sites such as government and private ambulatory outpatient hospital clinics, pharmacies, market places, malls, churches, schools, workplaces, medical missions, and other community activities.

A total of 18 dedicated volunteer investigators with a total number of 91 sites in various parts of the country used the approved MMM19 protocol designed by the ISH. The MMM19 local campaign organizers helped orient the volunteer investigators via lecture forums, face-to-face teachings, and video recordings on how to carry out the opportunistic BP screenings in various ways from May to July 2019. Recruitment of screenees was made through public health messages in local news publications, television, and radio guest appearances by the MMM19 organizers; and announcements of activities in various places like malls, market places, hospitals, and private clinics.

As in MMM17 and MMM18, validated Omron digital BP digital devices were provided at all sites. Other predictors of high systolic BP and diastolic BP were alcohol intake, smoking, and a previous history of hypertension in pregnancy, while pregnant participants had significantly lower BP. The MMM19 campaign succeeded in raising awareness of high BP in our country, and the opportunistic sampling enhanced a sense of people empowerment by their knowing how easy it is to detect high BP and thereby enabling the prevention of long-term health complications. The higher BP control in the MMM19 hypertensive individuals possibly attests to the success of the previous MMM17 and MMM18 campaigns.

Results

A total of 89 941 individuals participated with consent in the opportunistic BP screenings in various parts of the country. Out of the total participants, 47 925 (53.3%) had hypertension. The mean age of the participants was 44.6 years (SD: ±15.8), 53.3% were females (47 971) and 46.5% were males (41 826). In terms of ethnicity, the majority were South East Asians comprising 86 689 (96.4%), 1585 were South Asian (1.8%), and 1273 (1.4%) were East Asians. A total of 84 538 (94%) were new participants in any MMM BP screening and 5165 (5.7%) previously participated in either MMM17 or MMM18. A total of 12 881 (14.3%) had their BP measured more than 12 months ago and 1270 individuals (1.4%) had never had their BP measured. There were 9.0% (8127) diabetic patients, 3.5% (3128) reported having a previous myocardial infarction, and 1.5% (1377) reported having a previous stroke. In total, 9839(10.9%) were current smokers while 79 642 (88.5%) were non-smokers. About 11 666 (13%) participants were taking statins. Among all participants, 20 142 were overweight (22.4%) and 11 585 (12.9%) were obese whilst 43 217 (48.1%) were of healthy or normal weight.

After multiple imputation, 47 925 (53.3%) were found to be hypertensive out of the total 89 941 participants. Only 31 168 (65.0%) of those with hypertension were aware they
were hypertensive and 30,120 (62.8%) were taking antihypertensive medication. Of individuals not taking antihypertensive medication, 17,805 (29.8%) were found to have hypertension. Of those on antihypertensive medications, 11,706 (38.9%) had uncontrolled BP and 61.1% had controlled BP (<140/90 mmHg). Of the total 47,925 with hypertension, 38.4% had controlled BP.

Based on multivariable linear regression models, systolic and diastolic BPs were significantly higher among those with previous stroke and those receiving antihypertensive medications (Figure 1A). Differences in mean BP according to body mass index category showed significantly higher BPs in the overweight and obese compared with those of healthy weight (Figure 1B). Alcohol intake was also a significant predictor of higher systolic BP both among those taking one or more drinks per week and those who take one to three drinks of alcohol per month, as compared with those who do not drink alcohol or drink alcohol rarely.

Discussion

The result of the MMM19 through opportunistic BP screening across the nation showed more than half of the participants screened (53%) were hypertensive and 65% of those with HTN were aware of their condition. Only 63% were on antihypertensive medications. Among those on antihypertensive medications, 61% had controlled BP. Of the total participants with hypertension, only 38% had controlled BP. This implies that there is a need to intensify screening programmes to diagnose more patients as well as develop educational programmes especially among the high-risk groups to increase the overall control rates. It was noted that patients with a previous stroke and those receiving antihypertensive medications still had a higher BP, which may have contributed to the low control rate. These patients need to be referred back to their physicians for aggressive BP control.

The impact of MMM campaigns since 2017 has partly contributed to hypertension awareness and lifestyle and behavioural changes as reflected in the declining hypertension prevalence in the Philippines in 2018 and 2019. Despite the limitation of being a non-random sample and therefore being not representative of the national population, the MMM19 is a pragmatic public health programme that helps increase awareness and treatment rates of hypertension in the country.

May Measurement Month, in its 3rd year, helped fortify hypertension screening programmes in the Philippines. It is cost-effective to conduct with the active participation of dedicated organizers and volunteers. This is especially true in low- to middle-income countries with limited resources to do regular monitoring and surveillance. Based on other national surveys, a decreasing prevalence of hypertension in the country is noted. The PSH hopes that this decreasing trend will be sustained with concerted public awareness programmes including the annual MMM BP screening campaigns.

Acknowledgements

Our sincerest thanks to the following for their invaluable assistance in MMM19: Dr Carmela Napiza-Granada and Ms Hazel Torreblanca of Disease Prevention and Control Bureau Essential Non-Communicable Disease Division & Lifestyle Related Disease Division and all the participating government physicians nationwide under the Department of Health, Dr Lourdes Manese and Dr Regina Bartolome of the Manila Health Department, Dr Beverly de Guzman of the Philippine National Police, Dr Ma. Vinny Mina, Dr Arnold Benjamin Mina, Dr Norman Panfilo Rabago, Dr Elizabeth Montemayor, PSH Northern Luzon Chapter, PSH Southern Luzon Chapter, Philippine Heart Center, University of Sto. Tomas Hospital, Manila Doctors Hospital, James Gordon Memorial Hospital, Olongapo City, Subic Bay Metropolitan Authority, UNTV, PAGCOR, Getz Pharma Philippines, Pfizer Inc., Servier Philippines Inc., and all the participating government/private hospital nationwide under Servier Philippines, Omron Philippines for donating additional BP devices Inc. and PSH Secretariat.

Conflict of interest: A.F.D.: Member of Advisory Board or Speaker Bureau of the following: Novartis, Sanofi, Eli

Figure 1 (A) Differences in mean blood pressures in those with each condition such as previous stroke, myocardial infarction, hypertension, and antihypertensive medications compared with those without these conditions. (B) Differences in mean blood pressures according to body mass index (BMI) with healthy weight as the reference.
Lilly, Bayer, Menarini, Cathay YSS, Medichem, Lundbeck, Everpharma, Pascual Pharma, and One Pharma.

References

1. 2019 Expanded National Nutrition Survey, Food and Nutrition Research Institute. Trend in the Prevalence of Elevated Blood Pressure among Adults, 20 years old and above, 1993-2019. http://www.fnri.dost.gov.ph/index.php/national-nutrition-survey-nns (25 June 2019).

2. Sison J, Arceo LP, Trinidad E. Philippine Heart Association-Council on Hypertension Report on Survey of Hypertension and Target Organ Damage (PRESYON 2-TOD): a report on prevalence, awareness, treatment and control rate of hypertension. Philipp J Cardiol 2007; 35:1-9.

3. Stroke death rates in the Philippines: WHO 2018 published data Philippines. https://www.worldlifeexpectancy.com/philippines (29 November 2020).

4. Castillo R, Mercado-Asis L, Atilano A, David-Ona D, Diaz A, Granada C, Bonzon D, Vilela G, Chua C, Gomez L, Oliva R, Morales D, Beaney T, Ster A, Poulter N. May Measurement Month 2018: an analysis of blood pressure screening in the Philippines—South-East Asia and Australasia. Eur Heart J Suppl 2020; 22(Suppl. H):H104–H107.

5. 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, The MMM Investigators. May Measurement Month 2019: the global blood pressure screening campaign of the International Society of Hypertension. Hypertension 2020; 76:333–341.