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

Yook Chin Chia¹,²*, Siew Mooi Ching³,⁴, Navin Kumar Devaraj³,⁴, Bee Nah Chew⁵, Pei Boon Ooi¹, Mohazmi Mohamed², Azli Shahril Othman⁶, Pei San Kang⁷, Hanis Saadah Husin⁸, Abdul Hafiz Mohamad Gani⁹, Dalyana Hamid¹⁰, Thomas Beaney¹¹,¹², Anca Chis Ster¹¹, Neil R. Poulter¹¹, and Xin Xia¹¹

¹Department of Medical Sciences, School of Healthcare and Medical Sciences, Sunway University, 5 Jalan University, Bandar Sunway, 47500 Selangor Darul Ehsan, Malaysia; ²Department of Primary Care Medicine, Faculty of Medicine, University of Malaya, Lembah Pantai, 50603 Kuala Lumpur, Malaysia; ³Department of Family Medicine, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia; ⁴Malaysian Research Institute on Ageing, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia; ⁵Staff Health Unit, University of Malaya Medical Centre, Jalan Universiti, Lembah Pantai, 59100 Wilayah Persekutuan Kuala Lumpur, Malaysia; ⁶Faculty of Medicine, Cyberjaya University College of Medical Sciences, Persiaran Bestari, Cyber 11, 63000 Cyberjaya, Selangor, Malaysia; ⁷Gopeng Government Health Clinic, Jalan Lawan Kuda Baru, 31600 Gopeng, Perak, Malaysia; ⁸Department of Primary Care, International Medical School, Management & Science University, University Drive, Off Persiaran Olahraga, 40100 Shah Alam, Selangor, Malaysia; ⁹Mahmoodiah Government Health Clinic, JKR 6274, Jalan Mahmoodiah, 80000 Johor Bahru, Johor, Malaysia; ¹⁰AU2 Keramat Government Health Clinic, Jalan AU 2a, Taman Sri Keramat, 54200 Wilayah Persekutuan Kuala Lumpur, Malaysia; ¹¹Imperial Clinical Trials Unit, Imperial College London, Stadium House, 68 Wood Lane, London W12 7RH, UK; and ¹²Department of Primary Care and Public Health, Imperial College London, St Dunstan’s Road, London W6 8RP, UK

KEYWORDS
Hypertension; Blood pressure; Screening; Awareness; Treatment; Control; Malaysia

Hypertension continues to be the top global killer, contributing to over 10 million deaths annually. As prevalence and unawareness of hypertension remain high in Malaysia, this study was aimed to screen more individuals to identify those with undiagnosed hypertension. Respondents aged ≥18 years were recruited through opportunistic sampling at various screening sites including health clinics, hospitals, student health centres, universities, community halls, shopping malls, as well as through other health screening campaigns. Each respondent completed a questionnaire on socio-demographic, environmental, and lifestyle data. Anthropometric measurements as well as three blood pressure (BP) measurements were obtained from all participants. Hypertension was defined as a systolic BP ≥140 mmHg and/or diastolic BP ≥90 mmHg or taking antihypertensive medication. The total number of participants was 4866. The mean age of the participants was 39.8 (17.6) years with 61.1% female participants. Of the 4866 participants, 1405 (28.9%) had hypertension. The proportion of those aware of their hypertension status was 76.3% (1073/1405). The proportion of those with hypertension on medication was 71% (998/1405). Of

*Corresponding author. Tel: +60 3 74918622, Ext: 7410, Fax: +60 3 56358633, Email: ycchia@sunway.edu.my

Published on behalf of the European Society of Cardiology. © The Author(s) 2020.
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
Introduction

The prevalence of hypertension among adults aged 18 and above in the latest National Health and Morbidity Survey (NHMS) in Malaysia in 2015 was 35.3%. This showed an increase from 33.6% found 5 years earlier. In 2017, the main cause of mortality in Malaysia was cardiovascular disease (CVD) accounting for 21% of total deaths in which ischaemic heart disease contributed 13.9% followed by stroke, with 7.1%. The latest data from the Malaysian National Stroke Registry (NSR) found that more than three-quarters of patients with stroke had hypertension as its main risk factor. A study from China reported a large number of Chinese patients with hypertension (15.9%) were unaware of their hypertension status until they had the stroke.

Thus, blood pressure (BP) screening plays an important role in increasing awareness, and subsequent treatment and control of hypertension.

In 2017, the International Society of Hypertension, extending the concept of the World Hypertension Day, initiated a world-wide BP screening campaign called May Measurement Month 2017 (MMM17). Malaysia participated in this campaign and has continued to do so since then. Results from the MMM17 campaign in Malaysia showed the proportion of participants with hypertension was 32.4%, fairly similar to that of the 2011 national survey of 33.6%. In MMM17, we also found that nearly two-thirds (63.9%) were on treatment and 59.5% individuals with treated hypertension had achieved BP control.

As hypertension remains an important cause of CVD, and in view of many participants still being unaware of their elevated BP status, the aim of this BP screening campaign in Malaysia was to detect more undiagnosed hypertension and at the same time increase the awareness about screening for hypertension.

Methods

The screening of BP in Malaysia was led by Dr Yook Chin Chia, the then President of the Malaysian Society of Hypertension, assisted by Dr Siew Mooi Ching and Dr Navin Kumar Devaraj. Screening was conducted from 1 May to 30 July 2018 at 22 sites, namely health clinics, hospitals, universities, student health centres, community halls, shopping malls, as well as screening done during health runs in Peninsular Malaysia and two other sites in East Malaysia. Twenty-five investigators were briefed on the use of a standardized protocol.

A questionnaire was used to collect socio-demographic, environmental, and lifestyle data. Both weight and height were measured. Seated BP was measured three times using automated BP devices (Microlife-BP-AZ Basic, Omron JPN1, Omron HEM-7121, Omron HBP-1300, Beurer BM28) following a standard procedure of BP measurement. Hypertension is defined as systolic BP ≥140 mmHg and/or diastolic BP ≥90 mmHg or on treatment for hypertension.

Data were analysed centrally by the May Measurement Month 2018 (MMM18) project team and multiple imputation was performed for missing BP data based on the global data. Ethics approval was obtained from the National Medical Research Register (NMRR-18-876-40691), University of Malaya and Sunway University Ethical Boards.

Results

The total number of individuals screened was 4866. The mean age of the participants was 39.8 (±17.6) years with 61.2% being female participants (2978/4858). The majority of the participants were South-East Asians comprising of a multi-ethnic group of Malay, Chinese, and Indians (n=4023/4845, 83.0%). The majority of the participants (91.5%, 4451/4866) had three BP readings. The mean of the 1st and 2nd BP readings was 121.7/75.4 mmHg. The mean of the 2nd and 3rd BP readings was 119.9/74.3 mmHg.

After multiple imputation, of the 4866 participants, 1405 (28.9%) had hypertension. The proportion of those aware of their hypertension status was 76.3% (1073/1405). Overall the proportion of hypertensives on medication was 71.0% (998/1405) but was 93% (998/1073) amongst those aware of their hypertension status. Of those on antihypertensive medication, 62.4% (623/998) had controlled BP.

Interestingly, the systolic BP was 1.97 mmHg lower when measured on the right arm compared to measurement on the left arm [95% confidence interval (CI) −2.89 to −1.05, P < 0.0001]. However, there was no difference seen in the diastolic BP measurement. Both systolic and diastolic BPs were significantly lower in pregnant women as compared to non-pregnant women (−4.02 mmHg, 95% CI −6.98 to −1.05, P = 0.008, respectively).

Discussion

This screening campaign found that 28.9% of participants had hypertension. This figure is lower than the 32.4% found in MMM17, which could be due in part to an older average age in participants from the year 2017 (mean age 45.4 ± 18.5 years), while in this current study, the mean age was 39.8 ± 17.6 years. The lower prevalence could also be due to the fact that more participants for this year’s
screening were recruited from non-healthcare facilities such as universities, shopping malls, as well as during other health campaigns.

In this study, the proportion of hypertensives aware of having hypertension was 76.3%. This is higher than that found in the National Health and Morbidity Survey (NHMS) 2015 of 43.2%. Differences in the findings can stem from the fact that this study was using a non-randomized sample as compared to the NHMS 2015. Another possible reason could be that there is a likelihood of selection bias as those who are more health conscious or concerned about their health will be more likely to join this study and therefore contribute to the higher awareness figures as noted in our study. It could also be a result of the public education being carried out on a regular basis over the past few years. Hence public education about regular screening of BP still needs to be emphasized and conducted.

In terms of treatment, the majority of those aware of having hypertension were receiving treatment (93.0%). This indicates that once an individual is identified as hypertensive, they would very likely receive treatment. This is possible because Malaysia is very fortunate in that its public health care is easily accessible and free. The proportion of treated hypertensives with controlled BP was 62.4% which is almost similar to last year findings of 59.5%. As around 70% of our participants were recruited at health care facilities, it is very likely they would have been receiving treatment already, hence contributing to the higher control rate seen in our current study.

In conclusion, about 3 in 10 adults in our study have hypertension. The awareness (76.3%) and treatment rate amongst the aware (93.0%) are high. More than two-thirds of those who were on an antihypertensive agent had their BP controlled. Nevertheless, screening to increase awareness further and achieving higher control rates is still very important as it is well-established that treatment of hypertension reduces cardiovascular morbidity and mortality.

Acknowledgements

The authors would like to thank all the local investigators and volunteers who helped make this screening programme a great success. Special thanks to the Malaysian Society of Hypertension for providing financial support for our screening and to the central MMM18 screening team for the opportunity to participate in this worldwide screening campaign.

Funding

Malaysian Society of Hypertension provided financial support for travel and printing costs.

Conflict of interest: YC Chia has received honoraria and sponsorship to attend conferences and CME seminars from Abbott, Bayer, Boehringer Ingelheim, GlaxoSmithKline, Menarini, Merck Sharp & Dohme, Novartis, Omron, Orient Europharma, Pfizer, and Sanofi; and a research grant from Pfizer, and Omron.

References

1. Ab Majid NL, Omar MA, Khoo YF, Mahadir Naidu B, Ling Miaw Yn J, Rodzlan Hasani WS, Mat Rifin H, Abd Hamid HA, Robert Lourdes TG, Mohd Yusoff MF. Prevalence, awareness, treatment and control of hypertension in the Malaysian population: findings from the national health and morbidity survey 2006–2015. J Hum Hypertens 2018;32: 617–624.
2. Department of Statistics Malaysia. Press release: statistics on causes of death, Malaysia, 2018. 2019. https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=aWg2VjJkZHhyC0dEM3JSQGloeTVIz09 (24 March 2020).
3. Nazifah SN, Azmi IK, Hamidon BB, Looi I, Zariah AA, Hanip MR. National Stroke Registry: Terengganu and Seberang Jaya experience. Med J Malaysia 2012;67: 302–304.
4. Cao Q, Pei P, Zhang J, Naylor J, Fan X, Cai B, Dai Q, Sun W, Ye R, Shi R, Liu K, Jiang Y, Liu W, Yang F, Zhub W, Xiong Y, Liu X, Xu G. Hypertension unawareness among Chinese patients with first-ever stroke. BMC Public Health 2016;16:170.
5. Chia YC, Ching SM, Chew BN, Devaraj NK, Siti Suhaila MY, Tay CL, Kang PS, Verna Lee KM, Kong SZ, Teoh SW, Nurjamine AJ. May Measurement Month 2017 blood pressure screening: findings from Malaysia–South-East Asia and Australasia. Eur Heart J Suppl 2019; 21(Suppl D):D77–D79.
6. Beaney T, Burrell LM, Castillo RR, Charchar FJ, Cro S, Damasceno A, Kruger R, Nilsson PM, Prabhakaran D, Ramirez AJ, Schlachta MP, Schutte AE, Tomaszewski M, Touyz R, Wang J-G, Weber MA, Poulter NR; MMM Investigators. May Measurement Month 2018: a pragmatic global screening campaign to raise awareness of blood pressure by the International Society of Hypertension. Eur Heart J 2019;40: 2006–2017.
7. Institute for Public Health (IPH). National Health and Morbidity Survey 2015 (NHMS 2015). Vol. II: Non-Communicable Diseases, Risk Factors & Other Health Problem. Kuala Lumpur: Ministry of Health Malaysia; 2015. http://iku.moh.gov.my/images/IKU/Document/REPORT/nhmsreport2015vol2.pdf (26 February 2019).