

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

Huynh Van Minh¹, Nguyen Lan Viet², Cao Thuc Sinh³, Phan Nam Hung⁴,
Nguyen Thi Mong Ngoc⁵, Ngo Van Hung⁶, Tran Kim Son⁷, Nguyen Ta Dong⁸,
Doan Chi Thang⁸, Nguyen Duc Thuan⁹, Nguyen Dinh Thoan¹⁰, Hoang Anh Tien^{1*},
Thomas Beaney^{11,12}, Anca Chis Ster¹¹, and Neil R. Poulter¹¹

¹Department of Cardiology, University of Medicine and Pharmacy, Hue University, 6 Ngo Quyen, Hue City 530000, Vietnam;

²Department of Cardiology, Vietnam Heart Institute, 1 Ton that Tung, Hanoi 100000, Vietnam;

³Department of Cardiology, Vinh Medical School, 161 Nguyen Phong Sac, Vinh 460000, Vietnam;

⁴Department of Cardiology, Qui Nhon Hospital, 106 Nguyen Hue, Qui Nhon 820000, Vietnam;

⁵Department of Administration, Phu Yen Health Service, 4 To Huu, Phu Yen 620000, Vietnam;

⁶Department of Cardiology, Daklak Hospital, 2 Mai Hac De, Ban Me Thuot 630000, Vietnam;

⁷Department of Cardiology, Can Tho Medical and Pharmacy University, 179 Nguyen Van Cu, Can Tho 900000, Vietnam;

⁸Department of Cardiology, Hue Central Hospital, 16 Le Loi, Hue 530000, Vietnam;

⁹Department of Administration, Lam Dong Health Service, 6 Tran hung Dao, Dalat 670000, Vietnam;

¹⁰Department of Administration, Nha Trang Health Service, 3 Han Thuyen, Nha Trang 650000, Vietnam;

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;
MMM 2017;
Vietnam

Vietnam in the Asia Pacific region has a high hypertension (HTN) prevalence. The May Measurement Month (MMM) program was enthusiastically responded to in Vietnam by launching and deploying it across the whole country from 2017. The aims of the MMM 2018 program in Vietnam were to screen at least 15 000 people aged 18 and over across the country; to inform participants of the risks associated with HTN; and thereby define the proportion of subjects with elevated blood pressure (BP) and assess the awareness and the effectiveness of its treatment. An opportunistic cross-sectional survey of volunteers aged ≥ 18 was carried out in May 2018. Blood pressure measurement, the definition of HTN, and statistical analysis followed the standard MMM protocol. From May 2018 to June 2018, through 10 cities/provinces in Vietnam, 17 332 individuals with mean age 47.0 ± 17.9 years were screened during MMM18. After multiple imputation, 5260 (30.3%) had HTN. Of individuals not receiving anti-hypertensive medication, 1956 (13.9%) were hypertensive. Of patients receiving anti-hypertensive medication, 1540 (46.6%) had uncontrolled BP. Those who had HTN also displayed many additional risk factors similarly to MMM 2017 including smoking, alcohol, overweight-obesity, and diabetes. In conclusion, MMM 2018 campaign is a continuation program of MMM 2017 that has promoted the strength of the BP screening survey in the community in Vietnam, which hopefully will influence on awareness of disease prevention in this century. The next steps of the program will have special innovations on how to reduce the frequency of focusing on variable risk factors to change the overall picture of HTN in Vietnam.

*Corresponding author. Tel: +84 916106336, Fax: +84 234 3826269, Email: hatien@huemed-univ.edu.vn; bsanhtien@gmail.com

Introduction

Hypertension (HTN) remains a burden not only for developed countries but also for developing countries. Vietnam is located in the Asia Pacific region which has a high HTN prevalence. In Vietnam, from 1960 to 2008, the rate of HTN in adults increased 25 times from 1% to 25.1%.^{1,2} This is an alarming number because HTN causes serious complications such as, heart attack, stroke, and death. Annually in Vietnam, HTN causes 91 600 deaths (20.8% of total deaths) and 7.2% of Disability Adjusted Life Years lost, mainly through increased stroke and cardiovascular disease.³ However, HTN can be treated and managed in the community. Therefore, conducting research to investigate the rate of HTN in the community to have effective management strategies is very urgent. The 2017 May Measurement Month (MMM) program, initiated by the International Society of Hypertension (ISH), surveyed 1.2 million adults who ideally had not had blood pressure (BP) measurements for 1 year in 80 countries including Vietnam.⁴ The research results show that the rate of HTN was up to 28.7%, of which 37.7% of people had uncontrolled HTN.⁴ This is an alarming statistic and must be strictly followed up. The MMM program was enthusiastically responded to by Vietnam National Heart Association/Vietnam Society of Hypertension (VNHA/VSH) by launching and deploying it across the whole country. The goal of the MMM 2018 program in Vietnam was to screen at least 15 000 people aged 18 and over across the country to raise awareness and inform participants of the risks associated with HTN as well as to inform governmental organizations in order to further strengthen the existing HTN prevention program.

Methods

This was a cross-sectional descriptive survey. The campaign duration was from May to June 2018. As in MMM 2017, 10 cities and provinces of the 3 regions of Vietnam were selected from the North (Ha Noi, Vinh, and Thanh Hoa) to the Central and Highlands (Hue, Da Nang, Qui Nhon, Tuy Hoa, Nha Trang, and Daklak) and in the South of Vietnam (Ho Chi Minh City and Can Tho). Subjects surveyed were adults aged 18 and over, place of survey was very diverse locations including hospitals, clinics, pharmacies, and public places. The convenient sample size and sampling means people aged 18 and over voluntarily participated. The inclusion criteria were that the participants were well physically, mentally, and ready to cooperate. The exclusion criteria were those who were physically or mentally unwell, under 18 years old, refused to participate in the study, as well as those who were being treated for HTN in hospitals. The VNHA/VSH executive committee and/or the directors of the local health departments were the investigators. Volunteers were members of the Red Cross, the VNHA/VSH, among others, as well as medical students. The method of BP measurement was according to the guidance of the MMM 2018 program.⁵ The screening protocol was approved by the VNHA/VSH and the University of Medicine and Pharmacy in terms of ethics. Blood pressure machines

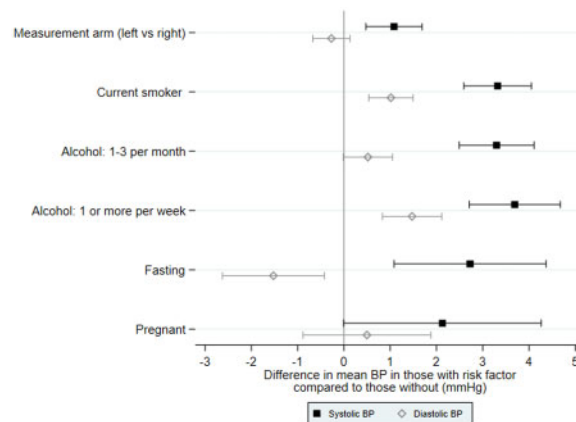


Figure 1 Difference in mean blood pressure comparing those with lifestyle factor to those without from linear regression models adjusted for age, sex, and antihypertensive medication (pregnancy adjusted for age and antihypertensive medication alone).

were semi-automatic OMRON HEM-7121. The BP method was based on the ISH protocol for MMM noting especially that the time between BP measurements is 1 min with three measurements taken, allowing the average BP of the second and third measurements to be calculated and used in the analysis. Where either measurement was missing, the mean was imputed using multiple imputation based on the global data.^{5,6} Hypertension was defined as systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg or on antihypertensive treatment. Body mass index (BMI) was classified according to WHO standards.² The survey questionnaire of the ISH for the MMM program was used.^{5,6} Data were collected using Excel 2013 and processed and analysed using Stata version 14.2 by the MMM team.

Results

The MMM 2018 program attracted more participants with 17 332 individuals compared to the MMM 2017 with only 10 993 people. In addition to some people who have had their BP measurement before, the proportion of people who never had a BP measurement accounted for 17.3%. Compared to those screened in 2017 MMM, the population with cardiovascular risk factors such as diabetes, smoking, and drinking alcohol, the rate was higher among MMM18 screenees.

After imputation, there were 5260 (30.3%) cases of HTN, which was higher than the proportion in 2017 (28.7%). Of those with HTN, 66.4% were aware of their diagnosis and 62.8% were on medication, of whom 53.4% were controlled. This is in comparison to the MMM 17 results, where 52.1% of hypertensives were on medication but 62.3% of these were controlled. Of all hypertensives, 33.5% were controlled.

Based on linear regression models adjusted for age and sex (with an interaction) and antihypertensive medication, patients who were current smokers and regular alcohol drinkers (once or more per week) were associated with higher SBP and DBP measurements (*Figure 1*). Similarly,

participants who were overweight or obese compared with those with a healthy BMI had higher SBP and DBP measurements. Conversely, underweight vs. healthy weight patients had lower levels of BP.

Discussion

In general, the results of MMM 2018 in Vietnam were highest number of participants than before. This can be explained by the team being more familiar with the activities of the program. The program has made an impact on the medical community and many centres participated even though we were still very limited in funding. There are two problems that need to be discussed: that the proportion found with HTN is still high and what are the main risk factors that can explain the increasing of the incidence of the HTN?

Through our two MMM 2017⁴ and MMM 2018 campaigns, the proportion of people who detected HTN was higher than the previous survey and more similar to the global results of the MMM 2017 (34.9%) and MMM 2018 (33.4%). In addition, around one-third of those with HTN were not aware of their condition. This is also notable because this dangerous disease has not been controlled despite many our efforts of the national health sector in the last years.¹

Therefore, it is still important to determine the main risk factors for HTN in Vietnamese people. In fact, many risk factors for HTN have been mentioned but in the context of our socio-economic development, the movement of the residential area was still a factor of concern. Nearly 20 years ago, we initially identified insulin resistance as a new risk factor for HTN in Vietnam.⁷ In 2015, the incidence of overweight-obesity was up to 15%³ but another study showed that the obesity rate reached 23%, diabetes 5.9%, and lipid disorders 56.2%.⁸ Obesity is not only causally linked to HTN, but also to diabetes. Obesity, metabolic disorders, which used to be uncommon in the last decades, have now become predominant. The number of subjects with diabetes in MMM survey however was relatively small, possibly as it was self-reported due to lack of appropriate tests and tools for examining the patients' blood glucose in our study. In the supplement of the MMM 2017 program attached to the online report, there was a strong positive correlation of BMI and BP in Vietnamese people,⁴ similar to the global MMM 2017 and 2018 results.^{5,6}

In conclusion, MMM 2018, a continuation program of MMM 2017, has promoted BP screening in the community in Vietnam, and increased awareness of disease prevention in our country. Certainly, the next steps of the program will

have special innovations on how to reduce the frequency of focusing on variable risk factors to change the overall picture of HTN in the world and also in Vietnam.

Acknowledgements

We sincerely thank the Ministry of Health, VNHA, OMRON Company, SERVIER Company, Hue University of Medicine & Pharmacy, Hue Cardiovascular Student Club and Health Services, Hospitals, Doctors, Volunteers in 10 screening sites particularly we would like to thank the ISH leaders, MMM leaders, ISH secretary, and ISH statistic team.⁹

Conflict of interest: none declared.

References

1. Son PT, Quang NN, Viet NL, Khai PG, Wall S, Weinehall L, Bonita R, Byass P. Prevalence, awareness, treatment and control of hypertension in Vietnam—results from a national survey. *J Hum Hypertens* 2012;**26**:268-280.
2. Do HT, Geleijnse JM, Le MB, Kok FJ, Feskens EJM. National prevalence and associated risk factors of hypertension and prehypertension among Vietnamese adults. *Am J Hypertens* 2015;**28**:89-97.
3. Nguyen TT, Hoang MV. Non-communicable diseases, food and nutrition in Vietnam from 1975 to 2015: the burden and national response. *Asia Pac J Clin Nutr* 2018; **27**:19-28.
4. Van Minh H, Viet NL, Sinh CT, Hung PN, Mong Ngoc NT, Hung NV, Son TK, Dong NT, Chi Thang Doan, Tien HA, Tuan HC, Beaney T, Xia X, Poulter NR, Schlaich MP. Blood pressure screening during the May Measurement Month 2017 programme in Vietnam—South-East Asia and Australasia. *Eur Heart J Suppl* 2019;**21**(Supplement D):D127-D129.
5. Beaney T, Burrell LM, Castillo RR, Charchar FJ, Cro S, Damasceno A, Kruger R, Nilsson PM, Prabhakaran D, Ramirez AJ, Schlaich MP, Schutte AE, Tomaszewski M, Touyz R, GuangWang J, Weber MA, Poulter NR; on behalf of the 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;**0**:1-12.
6. Beaney T, Schutte AE, Tomaszewski M, Ariti C, Burrell LM, Castillo RR, Charchar FJ, Damasceno A, Kruger R, Lackland DT, MA, Prabhakaran D, Ramirez AJ, Schlaich MP, Wang J, Weber Michael A, Poulter NR; on behalf of the MMM Investigators. May Measurement Month 2017: an analysis of blood pressure screening result worldwide. *Lancet Global Health* 2018;**6**:e736-e743.
7. Van Minh H, Thanh LC, Thi BN, Do Trinh T, Tho TD, Valensi P. Insulinaemia and slight overweight: the case of Vietnamese hypertensives. *Int J Obes Relat Metab Disord* 2018;**6**:e736-e243.
8. Hanh VTX, Thuong CNH, Hoang PTK, Mai NTT, Tai TV, Linh TH, Hoang T, Anh T, Hai PT. Prevalence of hypertension and diabetes among adults in Ho Chi Minh City—a community-based study in an urban district. *J Prev Med* 2017;**27**:79-86.
9. Poulter NR, Schutte AE, Tomaszewski CM, Lackland DT. May Measurement Month: a new joint global initiative by the ISH and the WHL to raise awareness of raised blood pressure. *J Hypertens* 2017; **35**:1126-1128.