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

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Elevated blood pressure (BP) is a growing burden worldwide, contributing to over 10 million deaths each year. May Measurement Month (MMM) is a global initiative organized by the International Society of Hypertension aimed to raise awareness of high BP. In May 2018, we carried out an opportunistic cross-sectional survey of volunteers from different parts of the country aged ≥18 years. Blood pressure measurement followed the standard MMM protocol and statistical analysis mean of the last 2 of 3 readings was used, where these were unavailable additional imputations were performed. In total, 4883 individuals (61.0% female) were screened during the whole month of May in 91 primary and secondary health facilities, pharmacies and through an online survey. After multiple imputation, 2841 (58.2%) had HTN. Of individuals not receiving antihypertensive medication, 850 (29.4%) were hypertensive. Of those receiving antihypertensive medication, 1025 (51.5%) had uncontrolled BP. MMM18 was the largest BP screening campaign undertaken in Slovenia. A substantial number of people with possible HTN were identified and referred to general practitioners for further management. The high number of individuals with HTN, with newly diagnosed HTN and with uncontrolled BP despite medication, confirms a real need for such screening programmes in our country.

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Introduction

Arterial hypertension (HTN) is one of the leading modifiable risk factors accounting for cardiovascular diseases (CVDs) and kidney failure, and represents the leading cause of mortality worldwide. It is responsible for over 10.4 million deaths yearly and given the population’s growth and ageing, this number is expected to increase. It has been proven that blood pressure (BP) lowering medication can prevent HTN-related cardiovascular events. However, despite treatment improvements, low awareness and inadequate BP control in treated patients remain. Therefore, the aim of May Measurement Month (MMM) is to increase awareness of the presence and dangers of HTN and improve the commitment of patients to reach their target BP goals.

Slovenia is a small country in southern Central Europe with a population of 2.08 million. Reported HTN prevalence in Slovenia in the year 2014 ranged from 24.8% to 28.0% of the whole population ≥18 years of age. For comparison, prevalence in the European countries for the same year ranged from 15% to 32%. Cardiovascular disease mortality in Slovenia represents 45.7% of all-cause mortality, which is slightly below the European average (48.9%). Ischaemic heart disease (IHD) mortality contributing to 175/100 000 deaths/year in men and 144/100 000 deaths/year in women and stroke 144/100 000 deaths/year in men and 86/100 000 deaths/year in women. Therefore, hypertension, a major contributor to CVD mortality, has utmost importance to further improve still poor statistics.

Our country started with yearly free BP measurements and awareness activities across the country back in 2005 when World Hypertension Day was announced by the World Hypertension League. In recent years, we invited the Slovenian Family Medicine Society, Slovenian Chamber of Pharmacies and National Institute of Public Health to participate and expanded activities from one day to the whole month of May.

Methods

In May 2018, the cross-sectional survey MMM18 was initiated by the International Society of Hypertension (ISH). The national co-ordinators for Slovenia were Assist. Prof. Jana Brguljan Hitij and Nina Božič from Department of Hypertension, University Medical Centre Ljubljana in the frame of Slovenian Hypertension Society. All the materials provided by the ISH were translated into Slovenian language. The study was approved by the National Ethics Committee, and all the participants gave written informed consent. We encouraged all national primary and secondary healthcare facilities and pharmacies to set up measuring sites of which 91 responded. We also set up two measurement sites in the University Medical Centre in Ljubljana. With kind support of the pharmaceutical company krka, d.d., we distributed all the materials to participants and we launched a campaign to promote MMM18 activities in the media through radio and internet messages.

A total of 4883 participants were screened in Slovenia in May 2018. The mean age of all participants was 58.9 ± 15.6 years, and women represented a higher proportion than men (2978 or 61.0%). Ethnicity was exclusively white. In total, 1991 (40.8%) participants were on antihypertensive medication. Of all screened individuals, 506 (10.4%) reported having diabetes, 199 (4.1%) reported a history of myocardial infarction, and 137 (2.8%) reported a previous stroke. A total of 752 (15.4%) were current smokers and 27 (0.9%) women reported to be pregnant. The mean body mass index was 27.3 ± 4.9 kg/m², 2871 (58.8%) of all participants were overweight or obese.

After imputation, 2841 of 4883 participants (58.2%) had HTN and 78.4% were aware of their diagnosis. A total of 850 (29.4%) of 2892 participants, who were not on antihypertensive medication, were hypertensive. Of those with HTN, 70.1% were on antihypertensive medication. Among those who were receiving treatment, 1025 (51.5%) out of 1991 had uncontrolled BP.

After imputation, the mean BP was 126.9/78.4 mmHg after standardizing for age and sex. From linear regression models, after adjustments for age and sex, significantly higher systolic BPs were seen in diabetic patients and smokers. Body mass index was also associated with higher BP, both systolic and diastolic BPs were significantly higher in overweight and obese people compared with normal weight participants. Systolic BP was significantly lower in patients with previous stroke.
Discussion

As part of MMM18, Slovenia included 4883 subjects, representing 0.23% of our country’s population. More than half (58.2%) of the whole cohort (treated or untreated) had HTN. Of those identified as hypertensive only 78.4% were aware of their high BP. Among treated patients, 48.5% had controlled BP. We identified 850 subjects with the possibility of newly diagnosed HTN and 1051 patients on treatment but with inadequately controlled BP, which represents 38.9% of the whole screened cohort. This clearly demonstrates the importance of inexpensive and simple screening at a population level for primary and secondary prevention. Such campaigns help increase awareness of HTN which can lead to reduction of CVD complications. However, it should be emphasized that due to the non-randomized inclusion of participants, the collected data cannot be evaluated as representative of the Slovenian population. Also, subjects were mainly recruited in health centres and pharmacies, so they are more likely to represent individuals who have regular contact with healthcare service due to their known illnesses. Nevertheless, this is a large sample and the data obtained at least partly follow data from other European populations, despite methodological obstacles.

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References

1. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, Alam Mzra MA, Amann M, Anderson HR, Andrews KG, Aryee M, Atkinson C, Bacchus LJ, Bahalim AN, Balakrishnan K, Balmes J, Barker-Collo S, Baxter A, Bell M, Blore JD, Blyth F, Bonner C, Borges G, Bourne R, Boussinesq M, Brauer M, Brooks P, Bruce NG, Brunekreef B, Bryan-Small E, Calabria B, Carapeti J, Carnahan E, Chafe Z, Charlson F, Chen H, Chen JS, Cheng A-A, Child JC, Cohen A, Colson KE, Cowl BC, Darby S, Darling S, Davis A, Deegnhardt L, Dentener F, Des Jarlais DC, Devries K, Dherani M, Ding EL, Dorsey ER, Driscoll T, Edmond K, Ali SE, Engell RE, Erwin PJ, Fahimi S, Falder G, Farzadfar F, Ferrari A, Finucane MM, Flaxman S, Fowkes FGR, Freedman G, Freeman MK, Gakidou E, Ghosh S, Giovannucci E, Gmel G, Graham K, Grainger R, Grant B, Gunnell D, Gutierrez HR, Hall W, Hoek HW, Hogan A, Hosgood HD, Hoy D, Hu H, Hubbell BJ, Hutchings S, Ibeanusie SE, Jacklyn GL, Jurasarina R, Jonas JB, Kan H, Kanis JA, Kasebaum N, Kheang Y-H, Khattibzaadeh S, Khoo J-P, Kok C, Laden F, Laloiio R, Lan Q, Lathlean T, Leasher J, Leigh J, Li Y, Lin JK, Lipshultz SE, London S, Lozano R, Lu Y, Mak J, Malekzadeh R, Mailinger L, Marcenes W, March L, Marks R, Martin R, McGale P, McGrath J, Mehta S, Memish ZA, Mensah GA, Merriman TR, Michar M, Michaud C, Misra H, Mianah KN, Mokdad AA, Morawski L, Mozaffarian D, Murphy T, Naghavi M, Neil B, Nelson PK, Nolan J, Norman R, Olives C, Omer SB, Orchard J, Osborne R, Ostro B, Page A, Pandey KD, Parry CD, Passmore E, Patra J, Pearce N, Pelizzari PM, Petzold M, Phillips MR, Pope D, Pope CA, Powles J, Raro M, Razavi H, Rehfuss EE, Rehm JT, Ritz B, Rivara FP, Roberts T, Robinson C, Rodriguez-Portales JA, Romieu I, Room R, Rosenfield LC, Roy A, Rushton L, Salomon JA, Sampson U, Sanchez-Riera L, Sannan E, Sapkota A, Seedat S, Shi P, Shiff C, Shikovskiy R, Singh GM, Sleet DA, Smith E, Smith KR, Stapelberg NJC, Steenkland N, Stöckl H, Stovner LJ, Straif K, Straney L, Thurston GD, Tran JV, Van Dingenen R, van Donkelaar A, Veerman JL, Vijayakumar L, Weintraub R, Weissman MM, White RA, Whiteford H, Wiersma ST, Wilkinson JD, Williams HC, Williams W, Wilson N, Wolff AD, Yip P, Zielinski JM, Lopez AD, Murray CJL, Ezzati M, Almazroa MA, Memish ZA. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet (London, England) 2012;380:2224–2260.

2. Poulter NR, Prabhakaran D, Caufield M. Hypertension. Lancet 2015; 386:801–812.

3. Chow CK, Koon KT, Rajagaran S, Islam S, Gupta R, Avezum A, Bahonar A, Chifamba J, Diaz R, Kazmi K, Lanas F, Wei L, Lopez-Jaramillo P, Fanghong L, Ismail NH, Puoane T, Rosengren A, Schipper F, Serebruany L, Serruys PW, Wei L, Williams HC, Williams W, Wilson N, Wolff AD, Yip P, Zielinski JM, Lopez AD, Murray CJL, Ezzati M, Almazroa MA, Memish ZA. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet (London, England) 2012;380:2224–2260.