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# May Measurement Month 2019: an analysis of blood pressure screening results from Slovenia

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## KEYWORDS

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Accounting for an estimated 10.4 million deaths each year, arterial hypertension is a worldwide epidemic. However, it is a treatable condition that can be readily recognized with cost-effective blood pressure (BP) measurements. Alongside continuous improvements in BP control and treatment, worldwide strategies aim to achieve a high level of hypertension awareness. May Measurement Month (MMM) is a global campaign initiated by the International Society of Hypertension to raise awareness of high BP. Slovenia began with yearly cost-free BP measurements and awareness campaigns in 2005 when World Hypertension Day was announced by the World Hypertension League and in 2017, we joined the MMM initiative. In May 2019, we performed a cross-sectional survey following the standardized MMM protocol. Healthcare personnel obtained BP measurements in a sample of adult subjects ( $\geq 18$  years) across all regions of the country, mostly in healthcare facilities and pharmacies. In total, 4974 individuals (61.1% female), with a mean age of 59.6 years, were screened. After multiple imputation for missing data, 3037 (61.1%) participants had hypertension. Of individuals not receiving antihypertensive medication, 973 (33.4%) were hypertensive. Of those who reported receiving antihypertensives, 1110 (53.8%) had uncontrolled BP. MMM19 was the largest BP screening campaign undertaken in Slovenia so far. We again identified a substantial number of participants with possible hypertension and uncontrolled BP despite taking antihypertensive medication, which were then referred to their general practitioners or dedicated hypertension centres for further evaluation and management. Taken together, our findings underline the importance of opportunistic screening programmes.

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## Introduction

Hypertension is one of the leading modifiable risk factors for cardiovascular disease and a major cause of mortality worldwide, accounting for an estimated 10.4 million deaths each year.<sup>1</sup> The prevalence of hypertension and its impact on cardiovascular morbidity and mortality are increasing globally.<sup>2,3</sup> It has been demonstrated that blood pressure (BP)-lowering medication can prevent hypertension-related cardiovascular events.<sup>4</sup> Alongside continuous improvements in BP control and treatment, worldwide strategies aim at achieving a high level of hypertension awareness.<sup>4</sup> May Measurement Month (MMM) is a global initiative organized by International Society of Hypertension (ISH) to raise awareness of high BP and improve the management of raised BP.

Slovenia is a country in southern Central Europe with a population of 2.1 million.<sup>5</sup> Epidemiological data on the prevalence of hypertension in Slovenia are scarce. The last epidemiological study, performed in 2009, estimated hypertension prevalence at 64.3%,<sup>6</sup> whereas the Slovenian National Institute of Public Health (NIPH) estimated the prevalence to be between 24.0% and 28.0% in 2014<sup>7</sup>; both studies had methodological limitations in terms of selection bias, probably leading to overestimation or underestimation of the hypertension prevalence, respectively.

Cardiovascular disease mortality represents 45.7% of all-cause mortality in Slovenia, which is slightly below the European average (48.9%).<sup>8</sup> Ischaemic heart disease (IHD) mortality amounts to 175/100 000 deaths/year in men and 86/100 000 deaths/year in women, whereas stroke is the cause of 144/100 000 deaths/year in men and 104/100 000 deaths/year in women.<sup>8</sup> Cardiovascular disease morbidity rates in our country roughly follow the European average with a prevalence rate of IHD 3111/100 000 in men and 1646/100 000 in women, and a prevalence rate of stroke of 582/100 000 in men and 579/100 000 in women.<sup>8</sup> In order to improve these unfavourable numbers, early recognition and adequate therapy of hypertension is of utmost importance.

Following the international initiative, we began with yearly cost-free BP measurements and awareness activities in 2005 when World Hypertension Day was announced by the World Hypertension League. In the last years, we established a collaboration with the Slovenian Family Medicine Society, Slovenian Chamber of Pharmacies, and NIPH. In 2017, we joined the MMM initiative and expanded our activities from one day to a whole month. In MMM18, we screened 4883 individuals: more than half (58.2%) of the participants (treated or untreated) had hypertension. We identified 850 (17%) subjects with possible hypertension and 1051 (22%) participants on antihypertensives with uncontrolled BP. These findings demonstrated the importance of such awareness campaigns and motivated us to take part in MMM19.

## Methods

In May 2019, the cross-sectional survey MMM19 was initiated by the ISH. The national co-ordinators for MMM in

Slovenia arising from the Slovenian Hypertension Society were Jana Brguljan Hitij and Nina Božič Ješe from the Department of Hypertension, University Medical Centre Ljubljana. All the materials provided by ISH were translated into the 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 across the country to set up measuring sites during the whole month of May. In 2019, we managed to reach beyond healthcare facilities and organized measuring sites in shopping malls and town squares in the two largest cities. We also established a collaboration with Društvo za zdravje srca in ožilja, an organization that promotes cardiovascular health. We launched a campaign to promote MMM19 activities in the media and set up an internet site with all the promotional materials and link to an online survey. On World Hypertension Day, we organized a press conference and our leading hypertension experts appeared on radio and television broadcasts to raise BP awareness. The campaign was funded by pharmaceutical companies Krka, d.d., and Servier.

At the BP measurement sites, participants were allowed to rest seated for 3–5 min. Meanwhile, we administered a standardized questionnaire to collect information on demographics, medical history, intake of medication, smoking and drinking status, and anthropometric characteristics. Following the MMM protocol, at up to three seated measurements were performed by trained staff using automated devices and with 1-min intervals between measurements. Hypertension was defined as receiving BP-lowering medications or having a systolic BP  $\geq 140$  mmHg or diastolic BP  $\geq 90$  mmHg. For participants on antihypertensive medication(s), controlled BP was defined as both systolic BP  $< 140$  mmHg and diastolic BP  $< 90$  mmHg. Individuals with HTN or uncontrolled BP were provided with printed dietary and lifestyle advice and recommendations to visit their GP or dedicated hypertension centres. Collected data were analysed centrally by the MMM project team and multiple imputation was performed to impute the mean of the 2nd and 3rd readings where they were missing.<sup>9</sup>

## Results

A total of 4974 participants were screened in Slovenia in May 2019. Overall, the mean age of the participants was 59.6 years (SD:  $\pm 15.3$ ) and 3041 (61.1%) were women. In total, 3887 (78.1%) were Caucasian, whereas the rest of the participants did not give information on their ethnicity. A total of 2064 (41.5%) subjects reported intake of antihypertensive medication. The majority had their BP measured before. Use of statins was reported by 1334 (26.8%) participants. Of all 4974 subjects, 3037 (61.1%) had hypertension and of these, 2319 (76.4%) were aware of their diagnosis. Of those with hypertension, 2064 (68.0%) were on antihypertensive medication. Among the treated subjects, 954 (46.2%) had controlled BP. Of all participants with HTN 954 (31.4%) had controlled BP. A total of 973 (33.4%) out of 2910 participants who were not on antihypertensive medication were hypertensive.

## Discussion

With 4974 participants, the MMM19 campaign represents the largest BP screening campaign so far in Slovenia. More than half (61.1%) of the whole study population (treated or untreated) had hypertension. Of those identified as hypertensive 23.6% were not aware of their high BP. Among treated patients, the majority (53.8%) had uncontrolled BP. We identified 973 subjects with possible undiagnosed HTN and 1110 inadequately treated subjects, which represents a total of 41.9% of the screened cohort. Due to methodological limitations and opportunistic sampling, the sample cannot be considered representative of the entire Slovenian population. Given the higher mean age and a large proportion of data being collected in healthcare facilities (64.3%), the prevalence of HTN is probably overestimated. Nevertheless, this is a large sample and obtained data are in line with reports from other European populations.<sup>10</sup>

## Conclusion

Demonstrating the need for organized campaigns, our study revealed a low level of awareness and high proportions of individuals with inadequately controlled BP. By participating in MMM19, we continued to raise awareness of hypertension and its consequences with the final goal of improving BP control and reducing future cardiovascular morbidity and mortality.

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**Conflict of interest:** none declared.

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