

May Measurement Month 2021: an analysis of blood pressure screening results from Poland

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May Measurement Month 2021 (MMM21) is the fourth edition of the global initiative in Poland initiated by the International Society of Hypertension (ISH) and aimed at raising awareness of hypertension and the need for blood pressure (BP) screening. An opportunistic cross-sectional survey of volunteers aged ≥ 18 was carried out in 132 sites - between May and September 2021. Blood pressure was measured in 1699 subjects (mean age: 40.8 ± 17.0 years; 68.8% females). After multiple imputation, the age and sex standardized systolic and diastolic BP was $126.6/78.7$ mmHg for the entire group, $133.8/81.9$ mmHg in individuals on antihypertensive medication, and $125.4/78.6$ mmHg in those not taking antihypertensive drugs. The proportion of subjects with high BP ($\geq 140/90$ mmHg) were: 30.9% for the entire group, 40.4% in subjects taking antihypertensive drugs, and 17.9% in those not taking antihypertensive drugs. Of all participants, 33.9% were in the age range of

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18-29 years and we observed higher BP levels and more frequent BP elevation in males in this age group. These data provide unique insights into the hypertension rates during the COVID-19 pandemic. Due to the associated restrictions, only limited data could be obtained for older adults. Interestingly, among young Polish participants, the rate of hypertension and the level of BP were higher in males compared to females, suggestive perhaps of a higher susceptibility of males to experience a rise in BP during specific circumstances associated with a pandemic.

Introduction

Cardiovascular mortality in Poland has declined since the 1990's, but is still high.¹ In 2020 and 2021, Poland was affected substantially by the COVID-19 pandemic, which also limited patients' access to cardiologists, other specialists, and hospitals. As a consequence, all-cause as well as cardiovascular mortality increased.² According to national statistics, cardiovascular diseases were responsible for 41.5% of all deaths before COVID-19.³ Compared to expected mortality following pre-pandemic trends, there were 71 000 excess deaths in 2020, of which 41 000 were due to COVID-19 and 30 000 due to other reasons, including limited access to medical services.^{3,4} In 2021, the excess number of deaths more than doubled to 154 000, of which 90 000 were COVID-19 related, and ~64 000 not related.^{3,4} Before the COVID-19 pandemic, hospitalizations due to acute myocardial infarction and stroke amounted to about 78 600 and 70 100 annually, respectively. Hypertension alone is the most important cardiovascular risk factor in developed countries.⁵ Large intervention studies clearly demonstrate that blood pressure (BP) lowering is associated with a substantial risk reduction for cardiovascular morbidity and mortality. However, hypertension unawareness remains high and represents a major barrier for BP control, especially in young individuals. The May Measurement Month (MMM) campaign was therefore established to screen for elevated BP and increase awareness. In Poland, the project ran for the fourth time in 2021, with its first edition taking place in 2017.⁶ In Poland's 2017 campaign, 49.0% of individuals treated for hypertension had uncontrolled BP, and for 2018 and 2019 were 39.2% and 41.8%, respectively.^{6,7,8} The first three campaigns have shown that opportunistic screening can identify substantial numbers of individuals with raised BP whether they were previously unaware or inadequately treated.^{6,7,8} The MMM campaign was continued in 2021, with the aim of improving awareness of raised BP.

Methods

An opportunistic cross-sectional survey of volunteers aged ≥ 18 was carried out in 132 sites across Poland between May and September 2021. Blood pressure measurement, definitions of high BP pressure or hypertension, and statistical analysis followed the approved MMM21 protocol.⁹ Each participant completed a questionnaire about demographic, lifestyle, medical, and environmental factors completed. Weight and height were also measured and three seated BP recordings, using semi-automatic devices were taken with 1 min intervals between readings. Multiple imputation was performed to estimate missing readings using the global data set.⁹ Hypertension was defined as systolic BP ≥ 140 mmHg or diastolic BP ≥ 90 mmHg (based on the mean of the second and third BP measurements) or taking antihypertensive medications. Data were collected via the MMM app and analysed centrally by the MMM project team. The project was approved by Local Ethical Committee.

Results

A total of 1699 volunteers participated in MMM21, and had BP measurements taken in various settings including, outpatient clinics (36.5%), outdoor spaces (1%), indoor spaces (57.5%), workplaces (1%), and other settings (4%). The mean (SD) age of the study sample was 40.8 (17.0) years and 68.7% were females. 4.4% of participants had diabetes, 1.8% had a previous myocardial infarction, and 1.1% a previous stroke. Of all participants, 12.2% reported a previous positive COVID-19 test and 53.6% had at least one COVID-19 vaccination before the screening took place.

After multiple imputation for missing BP values, we found that 525 participants (30.9%) had hypertension. Of those, 60.6% ($n = 319$) were aware of being hypertensive (Table 1) and 51.4% were taking antihypertensive medication. Of those receiving antihypertensive treatment, 59.6% were controlled ($<140/90$ mmHg). Among participants not receiving hypertension medication, 17.9% ($N = 225$ of 1429)

Table 1 Total participants and proportions with hypertension, awareness, on medication, and with controlled blood pressure

Total participants	Number (%) with hypertension	Percentage of hypertensives aware	Percentage of hypertensives on medication	Percentage of those on medication with controlled BP	Percentage of all hypertensives with controlled BP
1699	525 (30.9%)	60.6%	51.4%	59.6%	30.6%

Table 2 Total participants and percentages with hypertension, awareness, on medication, and with controlled blood pressure, stratified by age

	Total	Number with hypertension	Percentage with hypertension (%)	Percentage of hypertensives aware (%)	Percentage of hypertensives on medication (%)	Percentage of those on medication with controlled BP (%)	Percentage of all hypertensives controlled (%)
18-29 years	576	82	14.2%	30.3%	13.4%	63.6%	8.6%
30-39 years	280	52	18.5%	33.9%	27.0%	77.1%	20.8%
40-49 years	340	105	30.8%	59.2%	48.7%	68.6%	33.4%
50-59 years	222	104	46.9%	73.9%	65.3%	68.3%	44.6%
60-69 years	153	96	62.8%	72.0%	65.5%	58.3%	38.2%
70 years or more	128	87	67.8%	78.3%	72.6%	39.7%	28.8%

had hypertension. Overall, only 30.6% of those with hypertension had controlled BP levels.

The age and sex standardized mean systolic/diastolic BP was 126.6/78.7 mmHg of all participants, 133.8/81.9 mmHg in individuals on antihypertensive medication ($N=270$) and 125.4/78.6 mmHg in those not taking antihypertensive drugs ($N=1429$).

The percentages of people with hypertension increased with age, from 14.2% in the youngest subgroup (18-29 years), up to 67.8% in those aged 70 years or older (Table 2). There were also differences according to sex, with 41.4% of males found to have hypertension, compared to only 26.1% of females.

Discussion

In MMM21, due to COVID-19 associated restrictions, fewer adult and elderly participants could be enrolled, and hence younger subjects, specifically those aged between 18 and 29 years old, were somewhat overrepresented. While year-to-year comparisons may be of limited value in this context, more specific insights into the rates of hypertension and BP levels in younger (presumably healthier) Polish nationals could be obtained.

In MMM21 in Poland, 1699 participants were screened, of whom 525 (30.9%) had hypertension. Of those 525 participants with hypertension, 60.6% were aware and 51.4% were on antihypertensive medication. Of those 270 participants on antihypertensive medication, 59.6% had controlled BP. Only 30.6% of those with hypertension were found to have controlled BP. In MMM 2019, hypertension was observed in 55.4% of the entire cohort and BP was controlled in 46.7%. Our data seem to indicate a worsening of these statistics in the pandemic era. It needs to be highlighted that the sampling strategy was not randomized and so the figures may not be directly comparable with Polish studies conducted during the COVID-19 pandemic, in which BP increased significantly and the rate of BP control decreased.¹⁰

The restrictions associated with the pandemic resulted in a reduced number of enrolled participants, mainly elderly. This influenced the distribution of participants across the various age groups and limits the comparability with results from previous years. In 2021, participants were on average significantly younger (40.8 years) than in 2019 (54.1 years). Young adults of 18-29 years comprised 33.8% in 2021 as compared to only 8.4% in 2019. Direct total group comparisons may therefore be of lesser value, while providing an opportunity to look more specifically at the younger age groups and how their BP may have been affected by the pandemic. We observed better awareness of hypertension among women than in men, as well as almost a double the rate of BP control (38.3% vs. 20.0%) among treated hypertensives (Table 2). The higher number of young participants, however, allowed a more thorough analysis of the influence of sex on BP levels and control rates. Indeed, we observed higher BP levels in younger men compared to age-matched women. Young men may be particularly vulnerable to experience a rise in BP under circumstances associated with a pandemic. Irrespective of the underlying mechanisms, our data highlight that opportunistic or better systematic screening for

elevated BP should start already at a relatively young age, particularly in males.

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Data availability

The data underlying this article are available in the article and in its [online supplementary material](#).

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