

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

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### KEYWORDS

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May Measurement Month 2019 is the third edition of a global initiative organized by the International Society of Hypertension aimed at raising awareness of hypertension and the need for blood pressure (BP) screening. We present data analysis from Poland. To evaluate the potential of opportunistic BP measurements as a tool for cardiovascular disease prevention programmes. To collect new country data for further annual comparisons. An opportunistic cross-sectional survey of volunteers aged  $\geq 18$  was carried out in 201 sites in May 2019. BP was measured in 7072 subjects (mean age:  $54 \pm 15$  years; 62.3% females). After multiple imputation, the age- and sex-standardized systolic BP (SBP) and diastolic BP (DBP) was 125.4/78.5 mmHg in the whole group, 133.3/82.8 mmHg in individuals on antihypertensive medication and 123.3/77.7 mmHg in those not taking antihypertensive drugs. The proportion of subjects with high BP ( $\geq 140/90$  mmHg) were 41.8% in subjects taking antihypertensive drugs, and 19.6% in those not taking any antihypertensive drugs. Overall,

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hypertension was present in 55.4% of participants (3917 out of 7072), of whom 83.0% were aware of their diagnosis. 80.4% of hypertensives were taking antihypertensive medication. 46.7% of all hypertensives had BP controlled to target (<140/90 mmHg). Higher BP correlated with body mass index and age but not tobacco smoking. SBP but not DBP was higher in diabetic participants. These data provide evidence on the current epidemiology of hypertension and may serve as a source of information to introduce primary and secondary prevention programmes to reduce cardiovascular risk in Poland.

## Introduction

Although cardiovascular mortality has declined since the 1990's, cardiovascular diseases are still the biggest burden to health care in Poland. According to national statistics, cardiovascular diseases are responsible for 41.5% of all deaths.<sup>1</sup> National Health Fund data reports about 2.48 million patients with coronary artery disease, almost 750 000 patients with heart failure. Annual hospitalizations due to acute myocardial infarction amount to about 78 600 and stroke 70 100.<sup>2,3</sup> Hypertension alone is the most important cardiovascular risk factor in developed countries.<sup>4-6</sup> Close correlation between blood pressure (BP) values and mortality as well as high prevalence of hypertension has been known since the late 1980's. Numerous interventional studies in the last 30-40 years have shown a clear reduction in cardiovascular mortality due to BP treatment. One epidemiological study revealed 42.7% of adults in Poland (equivalent to 13 million inhabitants) had hypertension.<sup>7</sup> As we reduce the wide range of antihypertensive medications, the key success factors are early diagnosis and effective BP reduction to the recommended goals based on clinical trial evidence. BP control has improved significantly in the last 30 years in Poland, but still, it is far from ideal. Unawareness is the unsolved problem in young individuals. Therefore regular, e.g. annual, screening should improve awareness and the May Measurement Month (MMM) project was established with this in mind.<sup>8</sup> The primary aim of MMM is to promote information and build awareness but also to become a regular observational data source. The project which has run in over 100 countries, including Poland was initiated by the International Society of Hypertension. Therefore, the Polish Societies of: Cardiology, Hypertension, Nephrology, Family Physicians, and Study on Lipids have joined the MMM project since its first edition in 2017. In the Polish 2017 edition of MMM, 21.0% of subjects not taking any antihypertensive drugs and 49.0% of those treated for hypertension had high (or not well controlled) BP.<sup>9</sup> One year later, those figures were 18.6% and 39.2% respectively.<sup>10</sup> The first two editions have shown that opportunistic screening can identify substantial numbers of individuals with raised BP both in unaware subjects and in inadequately treated ones. The MMM project was continued in 2019 and the results of the third Polish MMM campaign are presented here.

## Methods

An opportunistic cross-sectional survey of volunteers aged  $\geq 18$  was carried out in 201 study sites in May 2019. The sites were scattered all over the country. BP measurement, definitions of high BP pressure or hypertension, and statistical analysis followed the approved MMM19 protocol.<sup>11</sup> Each participant had BP measured and a questionnaire about demographic, lifestyle, medical, and environmental factors filled in. Weight and height were measured. Three seated BP recordings, using semi-automatic devices (Microlife, Omron), were taken with 1-min intervals between readings. Multiple imputation was performed to estimate missing BP readings using the global data.<sup>12</sup> Hypertension was defined as systolic BP (SBP)  $\geq 140$  mmHg or diastolic BP (DBP)  $\geq 90$  mmHg (based on the mean of the second and third BP measurement) or taking antihypertensive medications, whereas high BP was defined as SBP  $\geq 140$  mmHg or DBP  $\geq 90$  mmHg. The hypertension treatment goal was defined as reduction of SBP  $< 140$  mmHg and DBP  $< 90$  mmHg. Data were collected via the MMM app and analysed centrally by the MMM project team. The project was approved by the Local Ethical Committee.

## Results

A group of 7072 volunteers, who consented to take part in MMM19, had BP measurements done in: outpatients' clinics (88.9%), outdoor space (4.2%), indoor space (3.9%), workplaces (2.1%), and others (0.9%). The entire 7072 group was stratified into prespecified subgroups and diastolic and systolic pressure were compared. BP values taken on each of 7 days of the week were compared. Subgroups were stratified *inter alia* according to BP measurement site type, body mass, sex, alcohol intake, pregnancy (in women only), smokers, and known patient's medical history (previous myocardial infarction, previous stroke, current diabetes, current hypertension, and use of antihypertensive treatment). Mean age of participants was 54.1 ( $\pm 15.2$ ) years. 62.3% were women, and 37.7% men. Caucasian Whites were 96.9%. SBP in both sexes increased with age, while DBP increased until around 45-50 years in men, and 60-65 years in women, and declined thereafter. A total of 3907 participants (55.2%) were not on antihypertensive treatment, while 3148 (44.5%) took at least one medication for BP. One medication class was used by 20.1%, two classes

**Table 1** Total participants and proportions with hypertension, awareness, on medication, and with controlled BP

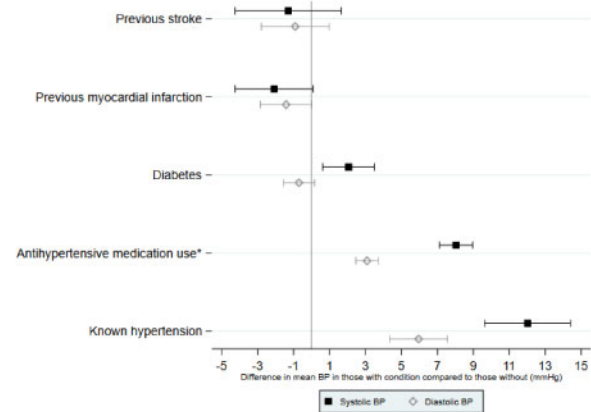
| Total participants | Number (%) with hypertension | Number (%) of hypertensives aware | Number (%) of hypertensives on medication | Number (%) of those on medication with controlled BP | Number (%) of all hypertensives with controlled BP |
|--------------------|------------------------------|-----------------------------------|---|--|--|
| 7072               | 3917 (55.4)                  | 3251 (83.0)                       | 3148 (80.4)                               | 1831 (58.2)  | 1831 (46.7)  |

by 12.6%, three classes by 9.0%, and four classes or more by 2.7%. The average BP of the total study group was 125.4/78.5 mmHg, while in untreated participants it was 123.3/77.7 mmHg and among those on antihypertensive medication it was 133.3/82.8 mmHg. 19.6% of subjects without treatment were hypertensive, and 41.8% on antihypertensive medication did not reach BP recommended goals. Of all participants, 55.4% were hypertensive, of whom 83.0% were aware of their diagnosis and 80.4% were on medication. Of all hypertensive participants, 46.7% had a controlled BP (Table 1).

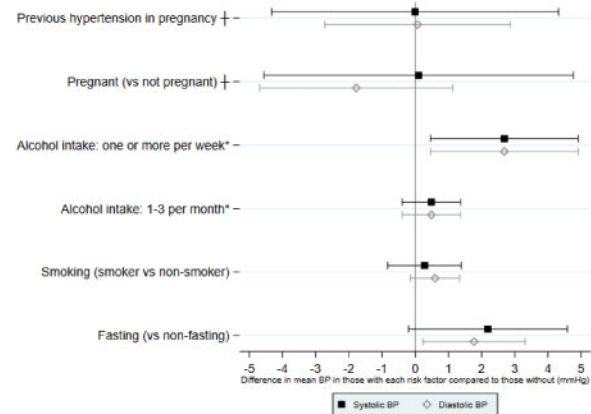
Of participants, 4.3% reported a previous myocardial infarction (MI), 2.0% a previous stroke, and 12.6% reported having diabetes. 17.1% were current tobacco smokers, 37.2% declared no alcohol use, 59.1% consumed alcohol one to three times per month, while 3.5% declared consumption of once or more per week. Both average SBP and DBP were significantly higher in known and treated hypertensive patients compared to unknown or untreated, respectively, after adjustment. Compared with non-diabetic participants, diabetic participants had a higher mean SBP by 2.06 mmHg ( $P=0.005$ ), but the DBP was not significantly different. Both post-MI and post-stroke patients had slightly, but not significantly lower BP values than their counterparts possibly due to better medical care and physicians' attention having been given to those patients with established cardiovascular diseases. This finding may support a thesis that secondary prevention is quite adequate but primary prevention seems far from ideal as regards to hypertension in Poland. Those results are detailed on Figure 1.

## Discussion

Despite obvious limitations of the opportunistic nature of the project, the large sample size mitigates them partially. The three editions of MMM data since 2017 also allow unique comparisons. In 2019, we had older participants, mean age of 54.1 years, vs. 41.1 and 42.0 in 2018 and 2017, respectively and more females (62.3% vs. 58.6% and 57.4%) were included. We had fewer current smokers (17.1%), and more diabetic participants (12.6%) than in previous years. However, average BPs were similar: 125.4/78.5 in 2019 vs. 126.7/78.4 in 2018 and 126.8/78.7 mmHg in 2017, despite the older population in 2019 albeit possibly offset by having more females. The proportion of subjects with hypertension among those not taking antihypertensive drugs was 19.6% compared to 18.6% in 2018 and 20.6% in 2017. However, hypertension overall as defined in the protocol



**Figure 1** Difference in mean blood pressure in those with selected medical conditions compared to those without such conditions. Only heavy or moderate alcohol consumption (defined as once or more per week) was associated with increased blood pressure and smoking did not alter blood pressure (Figure 2).



**Figure 2** Blood pressure values in subgroups according to chosen patients' features. Abundant alcohol consumption is a significant risk factor to increase blood pressure.

was observed in 55.4% of participants, compared to 32.8% in 2018, and 35.3% in 2017. This may be in part due to the inclusion of an older population who are receiving antihypertensive treatment. Whatever the explanation, the 2019 figures include large proportions of participants with untreated and uncontrolled hypertension, which is a huge challenge for the Polish health care system. About 40% of participants treated with antihypertensive drugs did not reach BP target levels. This reflects that only 55% of those on treatment took two or more drug classes. The need to

take several pills was a challenge in the past due to compliance issues but more recently many single-pill combinations of tablets are available and improvement in BP control should be less influenced by failed adherence. Education programmes both to patients and medical professionals to encourage adherence may be helpful. More detailed analyses showed that SBP but not DBP was significantly higher in diabetic patients than in non-diabetic ones, whilst increasing strata of body mass index were associated with higher SBP and DBP.

## Conclusion

MMM19 provides current evidence on several aspects of hypertension management in Poland. Almost three out of 10 screened had untreated hypertension, or treated and uncontrolled BP. These data may serve to inform and optimize primary and secondary care prevention programmes to reduce cardiovascular events in Poland.

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