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May Measurement Month 2018: an analysis of blood pressure screening results from the UK and the Republic of Ireland

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Raised blood pressure (BP) was the biggest contributor to the global burden of disease in 2017, with lack of awareness and adequate control of BP identified as the main drivers of this disease burden. In 2017, an opportunistic BP screening and awareness campaign called May Measurement Month (MMM) in the UK and Republic of Ireland (RoI) highlighted that levels of undiagnosed hypertension and uncontrolled hypertension in the community screened were approximately 23% and 40%, respectively. MMM18 was undertaken to further the campaign's efforts to increase awareness and create an evidence base of population risk associated with high BP. MMM18 BP screenings were conducted in the community at places of worship, supermarkets, GP surgeries, workplaces, community pharmacies, gyms, and various other public places. A total of 5000 volunteers, aged 47.3 (±17.2) years, 60% female were screened. Of all 5000 individuals screened, 1716 (34.3%) were hypertensive, of which only 51.3% were aware of their condition, 42.8% on antihypertensive treatment, and only 51.5% of those on medication controlled to target BP of <140/90 mmHg. Furthermore, obese, overweight, and underweight participants all had significantly higher BP values compared to individuals with a healthy body mass index (BMI). The 2018 MMM campaign in the UK and the RoI confirmed approximately one in three adults were hypertensive, with more than half having uncontrolled BP. In addition, these findings show that people with low BMI are at risk of having high BP. Finally, with only one in two people aware of their high BP, awareness remains a significant public health concern.

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Introduction

Hypertension affects more than 1 billion people worldwide, with numbers predicted to reach over 1.5 billion by 2025.[1] With raised blood pressure (BP) as the biggest contributor to the global burden of disease in 2017,[2] lack of awareness and adequate control of BP to national targets are identified as the main drivers of this disease burden. Globally, it has been shown that less than half of those with hypertension are aware they have the condition.[3] In the UK and Republic of Ireland (RoI), BP awareness and surveillance systems are generally implemented through their respective health care services and national clinical databases. Data from 2011 reported a prevalence of hypertension in England of 30%, with only 37% of those hypertensive patients controlled to target.[4,5] Furthermore, data from 2014 highlighted that an age-standardized prevalence of raised BP ($\geq$140 or $\geq$90 mmHg) was 15.2% in the UK and 27.9% in the RoI.[6] However, the extent of the problem in the wider community, especially those who do not regularly access health services has yet to be established. In 2017, the first May Measurement Month (MMM) BP screening campaign was conducted in the UK and the RoI. A total of 7695 participants were screened with 40.3% of participants identified as having hypertension and only 21.9% reported as taking regular antihypertensive medications. Importantly, the proportion of participants with hypertension and not receiving treatment was recorded as 23.4% and of those hypertensive participants receiving treatment, only 59.5% were deemed to be controlled (BP <140/90 mmHg).[7] These data highlighted the inappropriately high levels of undiagnosed hypertension in the community and low levels of BP control in hypertensive patients.

As a result of these findings, members of the British and Irish Hypertension Society (BIHS) and International Society of Hypertension (ISH) coordinated screenings across the UK and the RoI to further the campaign's efforts to increase awareness and create an evidence base of the extent of population risk associated with high BP.

Methods

Over the month of May 2018, opportunistic screening sites were set up to measure and increase awareness of BP. Screenings were conducted out in the community at places of worship, supermarkets, GP surgeries, workplaces, community pharmacies, gyms, and various other public places. Investigator-led training days for partners and those taking part in BP screening were conducted prior to screening events. Omron devices were provided to national partners that did not possess a validated BP system. In Wales, local funding from Cardiff Metropolitan University and Hirumed Ltd was used for marketing and campaign promotion purposes. In England, local funding was provided by the Academy of Medical sciences INSPIRE funding for marketing and logistics purposes. Celebrity and government public health endorsements via social media, national webpages, and newspaper articles were used to promote the campaign nationally. As per guidelines, only validated BP monitors were used and measurements were conducted in the seated position with 2nd and 3rd measurements used for analysis. Hypertension was defined as systolic BP $\geq$ 140 mmHg or diastolic BP $\geq$ 90 mmHg or on treatment for hypertension. In addition to the BP measurements, anonymized questionnaire-based information relating to BP (demographic, lifestyle, and environmental) were collected. Recorded measures of weight and height were measured or self-reported and body mass index (BMI) calculated. Body mass index categories were represented as: underweight: <18.5 kg/m^2; healthy weight: 18.5–24.9 kg/m^2; overweight: 25–29.9 kg/m^2 and obese: >30 kg/m^2. Data were collected using the MMM app, spreadsheets, or hard copy. Data were cleaned locally by the BIHS or MMM lead in Wales. All UK and RoI data were analysed centrally by the MMM project team, where multiple imputation was performed to obtain the mean of readings 2 and 3, where data were missing, based on the global data. Please refer to the methods section in MMM 2018 global paper for more in-depth information on collection, imputation, and detailed analyses.[8]

Results

Following the screening of 5000 volunteers with a mean age of 47.3 ($\pm$17.2) years and a male: female distribution of 40:60 in the UK and the RoI, 1716 (34.3%) were hypertensive, of whom 42.8% were on antihypertensive treatment and only 51.5% of those on medication controlled to target BP of <140/90 mmHg. Moreover, in all volunteers, only 22.1% were within the BP target range or controlled to target and of those not taking antihypertensive medication, 981 (23.0%) were found to have hypertension. Interestingly, these data show that only 51.3% of people with hypertension were aware of their condition.

Data were collected in a wide range of ethnic groups: 6.3% South Asian, 2.0% East Asian, 2.3% South East Asian, 4.6% Black, 77.6% White, and 0.9% Arabic. Increased systolic BP was associated with increased age, however, diastolic pressure increased between the ages of 18 and 49 years, before decreasing after approximately 50 years (Supplementary material online, *Figure S1*).

A curvilinear relationship was observed between both systolic and diastolic BP and BMI. Obese, overweight, and underweight participants all had significantly higher BP values compared to BP of individuals with a normal BMI [systolic BP: 7, 4, and 3 mmHg higher than BP of normal BMI group, respectively; and diastolic BP: 5, 3, and 4 mmHg higher than BP of normal BMI group, respectively (Supplementary material online, *Figure S2*)].

Discussion

These MMM18 data from the UK and the RoI highlight the fact that awareness of high BP remains an issue in the community, with just half of people with hypertension aware of

their condition. In contrast to the previous evaluations, this campaign identified a third of people as hypertensive compared to the 40.3% identified in the UK and the RoI MMM2017 dataset. These differences may highlight bias in self-selection or a 'healthy effect' in terms of selection in the MMM18 data, masking the true proportion of those with hypertension in the community. Importantly, only 4 of 10 of those identified as hypertensive reported taking antihypertensive treatment, with only half of those on medication controlled to a target (systolic BP <140 mmHg and diastolic BP <90 mmHg). Finally, these data highlight the important public health message that people who are underweight appear to have higher BP than those with a healthy weight and similar to those who are overweight and obese, although this relationship was not found in our data from 2017. These associations emphasize the major BP-related risk linking body weight and cardiovascular risk, which requires further public health attention.

Interestingly, these data illustrate that the proportion of hypertensive individuals identified through the MMM17 and 2018 datasets remain higher than the reported high BP prevalence data in the UK and the RoI (15.2% and 27.9%, respectively) from 2014. Similar to UK and the RoI data presented in MMM17, systolic BP increased with age with diastolic pressure increasing before decreasing after approximately 50 years.

The present data add to the growing evidence that awareness of BP is a significant public health issue within the UK and the RoI, and that a pragmatic, opportunistic, inexpensive, convenience sampling method of screening can help identify people at risk. More concerted efforts are therefore needed by national public health and policy-makers to promote more systematic screening initiatives in the future, with the aim of minimizing population risk and national economic burden of diseases associated with hypertension. Whilst helpful to understand the degree of BP associated problems in those who regularly attend their GP practice or occupational health services, traditional data in relation to prevalence of hypertension, undiagnosed hypertension, and awareness may not be directly related to the extent of the problem in the wider community. Through the greater involvement of partners from different sectors and the inexpensive, convenience sampling nature of the campaign, MMM was able to reach communities that otherwise may not have had access to measuring and knowing their BP.

Supplementary material

Supplementary material is available at *European Heart Journal Supplements* online.

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