


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

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Cardiovascular (CV) diseases are burdened by high mortality and morbidity, being responsible for half of the deaths in Europe. Although hypertension is recognized as the most important CV risk factor, hypertension awareness and blood pressure (BP) control are still unsatisfactory. In 2017, 30.6% of a >10 000 individual sample who took part in the May Measurement Month (MMM) campaign in Italy was found to have high BP. To raise awareness on the hypertension issue and to report BP data on a nation-wide scale in Italy. In the frame of the MMM campaign, an opportunistic cross-sectional survey of volunteers aged ≥ 18 was carried out in May 2018. Blood pressure measurement, the definition of hypertension and statistical analysis followed the standard MMM protocol. Screenings were conducted in multiple sites by health care personnel. Among the 5554 people screened (females: 48.3%, mean age 58 ± 17 years) mean BP was 127/77 mmHg, and after imputations, 1462 (26.3%) participants were found to have high BP levels. Body mass index >25 was associated with higher systolic BP and diastolic BP (DBP), while diabetes was associated with high DBP only. Our data provide a nation-wide snapshot of BP control in a sample of individuals participating in a national health care campaign, and confirm the power of this kind of healthcare-related activities in reaching a significant number of people to raise awareness on health topics. The apparent positive trend in BP control compared to available data from other similar campaigns carried out during the past years needs to be confirmed with more methodologically robust studies.

Introduction

Cardiovascular (CV) diseases (CVDs) are responsible for more than half of all deaths across Europe. Thanks to a combination of modifiable and unmodifiable factors, including but not limited to unhealthy lifestyle and improved survival to acute events, their prevalence is on the rise.¹

In 2016, the Italian Agency of Statistics (ISTAT) reported a yearly incidence of 367 deaths due to CVDs per 100 000 inhabitants, corresponding to a total of approximately 220 200 deaths. Of these, 69 653 were due to ischaemic heart disease, and 57 230 to cerebrovascular diseases.²

The effectiveness of total CV risk reduction in preventing events is universally accepted^{3,4} and up to 80% of premature heart disease and stroke are considered preventable.⁵ Arterial hypertension, known as the silent killer, represents the most important independent risk factor for CVDs,⁶ with a reported prevalence in Italy ranging from 55% to 59% of the adult population,⁷ with target blood pressure (BP) values reportedly achieved in <50% of known hypertensives.⁸ For this reason, the Italian Society of Hypertension has been active over many years in raising awareness in both the general population and health professionals on this issue, taking part each year for more than a decade in the World Hypertension Day activities, promoted by the World Hypertension League/International Society of Hypertension. On these bases, taking part in the May

Measurement Month (MMM) initiative^{9,10} was just the natural step forward, with the aim of reaching as many people as possible and of stimulating them to develop a more proactive attitude towards management of their cardiovascular risk profile, in particular in relation to their BP levels. In 2017, thanks to the invaluable contribution of more than 300 investigators affiliated to the Italian Society of Hypertension and of the Italian Red Cross, which supported the initiative with logistics and personnel, we were able to reach more than 10 000 people.¹¹ In 2018, we decided to administer a more complete questionnaire, collecting data on anthropometric variables as well as on comorbidities, a choice which has allowed us to obtain more comprehensive information, but at the price of a lower number of subjects accepting to participate.

Methods

MMM18 activities in Italy were co-ordinated by the Council of the Italian Society of Hypertension as in previous years. Informed consent was obtained for each participant onsite. No personal information was requested, as all forms were anonymously filled in. During the month of May 2018, 91 sites in Italy operated for a different number of days (from 1 to 5 days depending on the site), interviewing and measuring the BP of individuals aged 18 and over who decided to stop by. A total estimated number of 200 volunteers

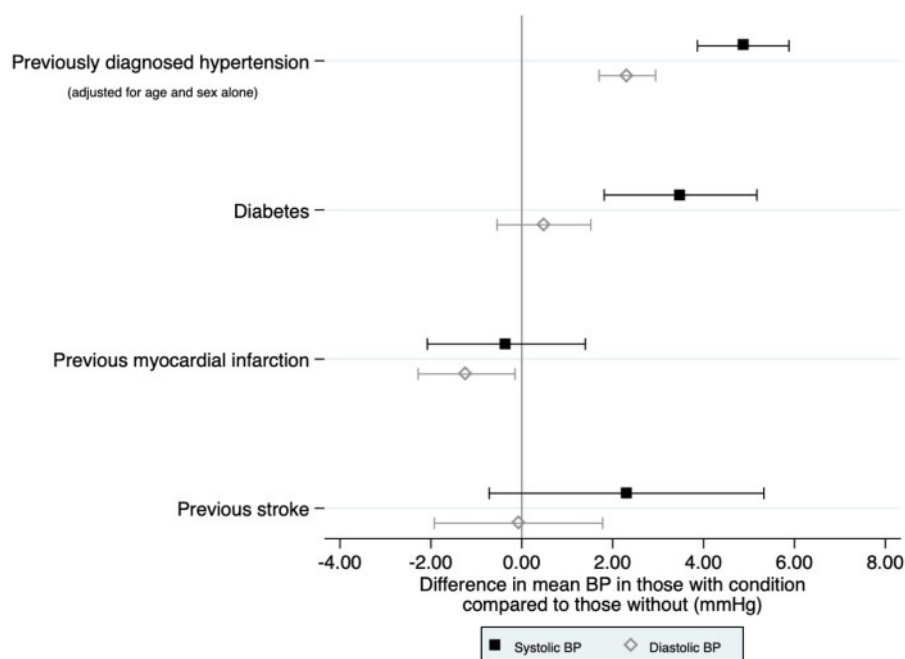


Figure 1 Mean blood pressure values in those with different cardiovascular risk factors compared to those without, from linear regression models adjusted for age and sex.

were involved in the campaign. Blood pressure measuring stations were available inside hospitals and at crossroads, with the logistical support of the Italian Red Cross, both in cities and villages. All the staff had a training in health care and received specific training on BP measurements. Either doctors, nurses, paramedics, and medical students performed the BP recordings and administered an *ad hoc* created questionnaire. In addition, outdoor measurements were performed in walled gazebos, in order to keep the ambient temperature controlled and to allow seated rest of suitable duration before the measurement. All selected devices had been validated accordingly to the ESH-IP protocol and BP measurements were performed according to the European Society of Hypertension/European Society of Cardiology (ESH/ESC) 2018 guidelines. In brief, three consecutive measurements were collected in the sitting position, with back and arm supported, after a 5-min rest. Hypertension was defined as BP >140/90 mmHg (average of the 2nd and 3rd measurements) and/or evidence of treatment with antihypertensive medication. Furthermore, height and weight reported by the participants were recorded, alongside with the history of cardiovascular risk factors.

The study was bottom funded, i.e. each centre which decided to take part in the activity printed its own questionnaires and BP forms and then sent the hard copies to the core lab for data entry facilitated by optical character recognition technology. Data were centrally analysed by the MMM team in London with multiple imputation according to the standard analysis plan.⁹

Results

Our sample consisted of 5554 participants (females: 48.3%), aged 58 ± 17 years. The absolute number of

participants per age groups increased by each decade after 39 years old, reaching the maximum for the age group >70 years, which counted 1581 subjects, representing 28.5% of the whole sample.

Active smoking was reported by 825 subjects (14.9%), diabetes by 446 (8.0%), previous myocardial infarction by 399 (7.2%), and previous stroke by 122 (2.2%). Mean body mass index was 25.4 ± 4.4 , with 47.3% of subjects being of normal weight or underweight and 49.3% overweight or obese (these data were not available in 3.4% of subjects).

Average BP (mean of reading 2 and 3) was 127/77 mmHg, with a proportion of hypertensives (as previously defined) after imputation of 26.3% out of the 5554 subjects screened.

Known hypertension ($N = 1692$, 30.5%) was associated with higher systolic BP (SBP) and diastolic BP (DBP) ($P < 0.0001$ for both), whilst diabetes was associated with higher SBP only. Furthermore, patients who reported a previous myocardial infarction had lower DBP ($P = 0.026$). Accordingly, obesity (14%) and overweight (35.3%) status were associated with higher SBP and DBP ($P < 0.0001$ for all), whilst underweight status (2.8%) was associated with lower SBP/DBP compared to normal weight (44.5%, $P < 0.0001$ for SBP, $P = 0.002$ for DBP) (see *Figure 1*).

Discussion

Our data, obtained through a cross-sectional survey, provide a contemporary update on BP values collected nationwide from a sample of the Italian population. As described, 26.3% of the screened individuals were found to be hypertensive, a proportion slightly lower than the one reported by our group in 2017 in the same frame of the MMM campaign (30.8% out of a sample of >10 000 individuals),¹¹ and in 2015, in a similar campaign conducted during the World

Hypertension Day (36% out of a sample of 8657 individuals).⁸ Similarly, the reported average BP values slightly but progressively decreased from 2015 (133/80 mmHg)⁸ to 2017 (130/78 mmHg)¹¹ to 2018 (127/77 mmHg). Although we recognize that the significance of these data, especially in terms of comparability from 1 year to the other, is weakened by a number of methodological limitations, typical of the ‘street epidemiology’ approach (including but not limited to sampling bias, incomplete sample characterization, environmental factors unaccountable for the lack of specific cut-off values for BP measured in such circumstances), they still appear encouraging. In fact, over the years many efforts have been made by the Italian Society of Hypertension aimed at raising awareness of hypertension and its complications,¹² increasing early diagnosis and improving BP control. These efforts now seem to yield appreciable results. As per the other findings, they are generally consistent with available literature, including the relationship between body weight and BP, the increased prevalence of high BP values in diabetic patients, the gap observed between females and males BP, which narrows as age increases.³

By joining the MMM campaign, we have thus been able to reach a significant number of people, to measure their BP in a carefully standardized manner and to spread higher awareness on hypertension and its untoward consequences with the final goal of improving BP control (as shown by the progressive reduction in the average BP levels we have recorded over the years) which might help to reduce CV morbidity and mortality.

Supplementary material

[Supplementary material](#) is available at *European Heart Journal Supplements* online.

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Conflict of interest: none declared.

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