

May Measurement Month 2018: an analysis of blood pressure screening campaign results in India

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KEYWORDS

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Hypertension (HTN) is the greatest attributable risk factor for cardiovascular disease in India. Recent studies have reported the crude prevalence of HTN in India to be 25.3%. In the May Measurement Month (MMM) screening campaign of 2017 conducted in India, 31.8% had HTN. In order to ratify earlier results, and further understand the awareness and control levels of HTN in India, organizations that participated in MMM 2017 decided to participate in the MMM global screening initiative of the International Society of Hypertension for a 2nd consecutive year. A total of 345 234 individuals were screened in MMM 2018. There were more than 1000 screening locations that included hospitals, clinics, workplaces, and special health camps organized across the country. After applying multiple imputation, a total of 111 462 (32.3%) individuals had HTN of whom 63 415 (55.6%) were aware of HTN and 61 646 (55.3%) were on antihypertensive medicines, out of which 15 583 (25.3%) were uncontrolled. Overall 57 864 (41.3%) hypertensives were uncontrolled. About half (44.7%) of hypertensive population in India were not on treatment. Around two-thirds (65.7%, $n=226\,924$) had not measured their blood pressure (BP) in last 12 months and 64% measured their BP for the first time in their life during the campaign, which strongly indicates the need for large scale awareness drives. This study suggests that opportunistic periodic public health screening at a national level is needed to increase HTN detection, treatment, control, and countrywide awareness in highly populated nations like India.

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Introduction

Hypertension (HTN) has emerged as the greatest risk factor for global morbidity and mortality. According to recent studies in India, the crude prevalence of HTN has been reported to be 25.3% among adults, with greater prevalence among men (27.4%) as compared to women (20.0%) and reducing urban-rural difference.¹ Hypertension is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease deaths in India. In an earlier study by the Global Burden of Disease study group, 20.6% of Indian men and 20.9% of Indian women were suffering from HTN in 2005.² The rates for HTN were then projected to go up to 22.9% and 23.6% for Indian men and women, respectively, by 2025.³ However, current studies from India indicate that the prevalence of HTN projected for 2025 has already been reached by 2016.³ Studies from India have shown the prevalence of HTN to be 25% in urban and 10% in rural people in India, and this divide is becoming smaller with the passage of time.² Apart from this, male gender, increasing age, higher body mass index (BMI), increased waist-hip ratio, increased body weight, family history of HTN, death of a spouse, and diabetes are already well correlated with HTN.⁴ Only ~25.6% of treated patients had their blood pressure (BP) under control in a recent multi-centre study from India on awareness, treatment, and adequacy of control of HTN.⁵ A more recent study has shown that HTN is widely prevalent in India with large regional variation, greater prevalence in urban areas and the young, with low treatment and control rates.⁶ As World Hypertension Day is marked on 17 May every year, the International Society of Hypertension (ISH) made a call to measure BP in the month of May ideally for those who have not had it measured for at least 1 year. This campaign has been given the name 'May Measurement Month' (MMM). During MMM in 2017 (MMM17), out of 122 685 individuals, 31.8% ($n = 38\,974$) had HTN and 17 205 (14.0%) were on antihypertensive treatment. Excluding them, 21 769 (20.6%, of $n = 105\,480$) had HTN but were not being treated. Among 17 205 participants who were receiving treatment for HTN, 82.6% were uncontrolled.⁷ Inspired by the results of MMM17, we participated again in MMM 2018 (MMM18), with an objective to raise awareness about BP among the Indian population.

Methods

During the MMM18 study in India, multiple groups coordinated special medical camps at screening sites such as hospitals, clinics, metro stations, residential colonies, villages, diagnostic laboratories, and offices across the country. The campaign was conducted in over 1000 screening sites across India from 1 May to 31 July 2018. In a unique drive, Rural Health Progress Trust conducted 'Check Your Blood Pressure Yatra' in a mobile van which travelled 4000 km, passing through eight states of India. More than 8000 people were screened and benefitted. Institutional ethics clearance was taken from the respective Institutional Ethics Committees by all screening sites involved in the study. The study involved more than 600

trained volunteers and field personnel. There were trained site co-coordinators at the various screening sites. Advertisement for recruitment was made through distribution of pamphlets, flyers, advertisements in online, and print media. Blood pressure was measured by either an automated or manual sphygmomanometer. All BP measurements were taken in the seated position. Participants were made to sit for 5 min before the first measurement and three measurements were obtained with an interval of 1 min in between each measurement. Weight and height were also documented. Blood pressure was calculated from the mean of the 2nd and 3rd readings, and HTN was defined as a systolic BP of at least 140 mmHg and/or a diastolic BP of at least 90 mmHg or on antihypertensive medication or both. Where the mean of the 2nd and 3rd reading was unavailable, multiple imputation based on the global data⁸ was used to impute the reading. The campaign was promoted internationally by the ISH and nationally by the Indian Council of Medical Research, Indian Society of Hypertension, Public Health Foundation of India, Indian Association of Parenteral and Enteral Nutrition, and Rural Health Progress Trust. The data were compiled and analysed centrally by the MMM project team at ISH.

Results

A total of 345 234 participants were included in the analysis. Most of the participants were of South Asian ethnicity (92.4%), 57.8% were male, and the mean age was 42.6 ± 16.0 years. Females have been shown to have higher systolic BP than males after 65 years of age and higher diastolic BP after 75 years of age (*Figure 1*).

Out of all the participants, 64.0% ($n = 221\,039$) had measured their BP for the first time in their life and only 28.1% ($n = 97\,015$) recorded their BP within the last 12 months. A total of 81% ($n = 279\,643$) were currently not on any kind of antihypertensive medication. Mean BMI was 24.0 ± 4.8 kg/m² with 26.4% ($n = 91\,273$) overweight and 10.9% ($n = 37\,607$) obese. There is a significant increase in both systolic and diastolic BP in participants who are overweight or obese compared to participants who are a healthy weight (see [Supplementary material online, Figure S1](#)). Conversely, participants who were underweight were associated with having lower systolic and diastolic BP, compared to those of a healthy weight. These results were in accordance with MMM17 results.

The overall proportion with HTN was 32.3% (111 462 out of 345 234). Of those hypertensives, 56.9% ($n = 63\,415$) were aware and 55.3% ($n = 61\,646$) were on medication. Of those on antihypertensive medication, 25.3% ($n = 15\,583$) had uncontrolled BP. Of those not on antihypertensive medication, 17.6% ($n = 49\,815$) were found to have raised BP. The mean difference in BP compared to baseline was maximum with alcohol intake of one or more drinks per week (systolic BP 3.31 mmHg ± 0.25 and diastolic BP 2.90 mmHg ± 0.17) followed by alcohol intake 1-3 per month (systolic 2.66 ± 0.20 and diastolic 1.96 ± 0.13), both compared to participants who never or rarely drink alcohol (see [Supplementary material online, Figure S2](#)).

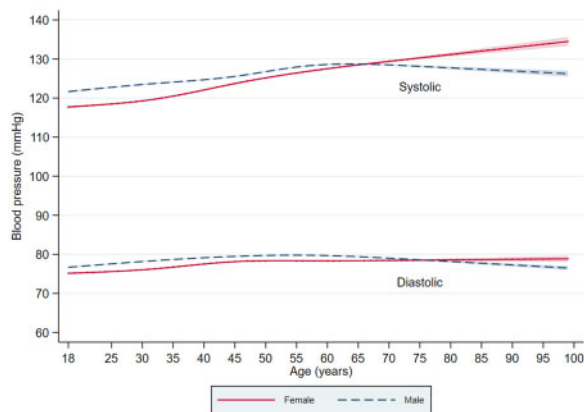


Figure 1 Change in blood pressure with age and sex from linear regression model, excluding individuals receiving treatment.

Discussion

A sizeable proportion of hypertensives were identified in this 2nd consecutive MMM campaign with very little change from 31.8% in MMM17 to 32.3% in MMM18.⁷ Although only 2.5% of the participants were common in MMM17 and MMM18, many of the trends remained similar in MMM18. For example, trends of HTN with weight gain were similar to the previous year. At the same time, being the largest screening campaign of HTN, we were able to reveal several less explored facts about HTN in India. The impact of alcohol on BP was clearly visible, with higher systolic as well as diastolic BP seen in frequent drinkers (1-3 times a month or once or more per week) compared to those who never or rarely drink (see [Supplementary material online, Figure S2](#)). Elderly females had higher systolic after 65 years of age while higher diastolic after 75 years of age than males (see [Figure 1](#)).

During the screening of MMM18, we have tried to collaborate with larger organizations on a larger scale. Exceeding targets set for MMM18, we recruited 345 234 participants generating much more clear data to help describe the HTN scenario in India. Similar to previous studies that reported low awareness level, increasing morbidity, and poor control of HTN in India,⁶ in MMM18 we observed that a staggering 64.0% of the participants had never checked or recorded their BP prior to the campaign. Only 17.9% of participants were taking antihypertensive medication and only a quarter of them (25.3%) were uncontrolled. This pattern was different than previously reported in MMM17 when 82.6% were uncontrolled despite taking treatment. This positive trend could be due to awareness drives from many organizations along with this MMM campaign although the samples were not the same in the 2 years. Previous studies have already reported similar pattern of unawareness, poor control, and inadequate medical facilities.^{1,2,5}

The worrisome trend and relentless occurrence of HTN, which may also present as complications such as myocardial infarction and stroke may be occurring at younger ages. So the rising trend in HTN is an alarming situation for the country (see [Supplementary material online, Table S1](#)).

Data from MMM17⁶ and now MMM18 clearly explain that India is under a serious threat of HTN-mediated diseases which are destroying the health of many of its citizens. This insurmountable documentation may help us in designing suitable interventions to decrease prevalence of HTN through increased awareness, formulation of government health policies, and revision of the Indian HTN guidelines for more aggressive BP reduction. We believe that the screening drive of MMM project for two consecutive years has made a significant impact on awareness level for HTN at all levels, including among the public, health care providers, policymakers, government, and media. In future, more massive screening campaign for HTN should be undertaken with follow-ups of participants from previous years.

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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