

# May Measurement Month 2017: an analysis of the blood pressure screening campaign results in Pakistan—South Asia

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Elevated blood pressure (BP) is a growing burden worldwide, leading to over 10 million deaths each year. May Measurement Month (MMM) is a global initiative aimed at raising awareness of high BP and to act as a temporary solution to the lack of screening programs worldwide. Hypertension is a global health concern for developing countries. In Pakistan, apart from few population-based studies which evaluated the prevalence of hypertension, there is no current nationally representative study (the latest nationwide survey was conducted more than two decades ago). Pakistan Hypertension League, in accordance with the International Society of Hypertension directive under the banner of the May Measurement Month 2017 (MMM17) campaign, carried out a nationwide cross-sectional survey of volunteers aged  $\geq 18$  in May 2017 through its 14 regional chapters. Blood pressure measurement recorded through digital apparatus, the definition of hypertension ( $\geq 140/90$  mmHg or being on BP-lowering treatment) and statistical analysis followed the standard MMM protocol. A total of 5333 individuals were screened during the MMM17 campaign with mean age 45.0 (11.6). Males had a higher rate (66.3%,  $n = 3536$ ) in those screened than females (33.0%,  $n = 1757$ ). A total of 55.2% ( $n = 2943$ ) people had hypertension. This result shows very high rates of hypertension in Pakistani people. Therefore, there is an urgent need for federal implementation of BP screening as well as awareness programs across the nation.

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## Introduction

High blood pressure (BP) is a major modifiable risk factor contributing to the current pandemic of cardiovascular diseases (CVD). This is particularly challenging for developing countries that are estimated to house three-fourths of the global burden of patients with hypertension in the coming few decades.<sup>1</sup> Despite the well-established benefits of lowering BP control and thorough existing guidelines, even in parts of the developed world less than one-third of the patients achieve recommended BP values of  $<140/90$ .<sup>2</sup> Projected increase in CVD is expected to be much greater in South Asia than in any other region worldwide,<sup>3</sup> where it

is expected to more than double over the next 20 years.<sup>4</sup> The burden of coronary heart disease (CHD) in South Asians extends beyond regional concerns, as CHD mortality and morbidity remain higher in immigrant South Asians living in western regions compared with native western populations.<sup>5</sup> Data from the developing countries, particularly in Pakistan, are barely emerging in this regard. The Pakistan Hypertension League (PHL), as a member of the International Society of Hypertension, got involved with May Measurement Month (MMM). The objective of this survey was to raise awareness of BP in a Pakistani population.

## Methods

The Pakistan Hypertension League, under the banner of MMM, conducted a cross-sectional survey by involving all of

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its 14 regional chapters throughout Pakistan. More than 150 volunteers were selected to conduct this survey with the help of the pharmaceutical industry and were trained at PHL regional chapters. All of the 14 sites' team members were supervised by the regional chapter coordinators. Screening camps were arranged in the month of May 2017 by the PHL at public places, hospital visiting areas, and at various institutions, to allow the general public to be screened for their BP's. After taking informed consent, research volunteers at every camp enrolled individuals aged 18 or above. An MMM pre-piloted data tool was used to record the demographic data including age and gender. Blood pressures of every individual were recorded in the sitting position, using an OMRON digital BP apparatus. Hypertension was defined according to the JNC7 guidelines.<sup>6</sup> A subject was classified as having hypertension if the BP reading was  $\geq 140/90$  mmHg or in those taking medication for high BP. Study participants' identities were kept anonymous and their privacy was ensured. All data were coded and analysed by the MMM statistics team. Mean  $\pm$  1 standard deviation (SD) were computed for all continuous data, and frequencies were calculated for categorical variables.

## Results

General characteristics of study participants are presented in *Table 1*. There were 5333 participants screened in this study. Of these, 3536 were males (66.3%) and 1757 were females (33.0%). The mean age of study participants was 45.0 (SD 11.6) years. Age and gender standardized mean systolic BP (SBP) was 133.2 mmHg and diastolic BP was 84.8 mmHg (*Table 2*). A total of 55.2% (2943/5333) participants had hypertension. This survey shows the very high prevalence of hypertension in this Pakistani population.

## Discussion

Results of this survey show a high proportion (55.2%) of our study group had hypertension with a mean age of 45.0 years. The incidence of cardiovascular complications are rising sharply in this region therefore control of BP is extremely important in the Pakistani population.<sup>7,8</sup>

In 2014-15, Pakistan Health Research Council conducted a survey on Non-Communicable Risk Factors in Pakistan, which shows about 45.3% people never got their BP checked, almost 37% of the population had Stage I hypertension and 15.9% had Stage II hypertension.<sup>9</sup> Modifiable risk factors of CVD such as hypercholesterolaemia and sedentary life style also need to be evaluated as they are associated with high BP. Studies have shown that increased cholesterol levels alter the peripheral and the renal vascular tone increasing the progression of high-normal BP to hypertension (BP > 140/>90).<sup>10</sup> Similarly, physical inactivity raises the SBP, while elevating total cholesterol levels as well.<sup>11,12</sup>

In Pakistan, with a population of 197 million, it is very important to develop more effective strategies for better high BP detection and management to achieve adequate therapeutic control of BP. It will include national education

**Table 1** General characteristics of study participants

Participant characteristics	Total	Percentage
Gender		
Female	1757	33.0%
Male	3536	66.3%
Unknown	40	0.8%
Age (years)		
Mean (SD)	45.0 (11.6)	
Unknown	144	2.7%
Total participants	5333	100.0%

**Table 2** Mean blood pressure readings

	Crude BP	Age and sex standardized BP
Systolic blood pressure (mmHg)	134.3	133.2
Diastolic blood pressure (mmHg)	85.8	84.8
Denominator	5333	5150

campaigns to increase the awareness about high BP, controlling modifiable risk factors, better patient counselling to improve lifestyle, and adherence to treatment. Also large scale studies at a national level are needed to evaluate the association of BP with modifiable risk factors in the Pakistani population. This will help in the development of better and effective strategies to prevent and treat hypertension in the Pakistani population and reduce the increasing burden of CVD in this region.

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## References

- Kearney PM, Whelton M, Reynolds K, Muntner P, Whelton PK, He J. Global burden of hypertension: analysis of worldwide data. *Lancet* 2005;**365**:217-223.
- Hajjar J, Kotchen TA. Trends in prevalence, awareness, treatment, and control of hypertension in the United States, 1988-2000. *J Am Med Assoc* 2003;**290**:199-206.
- Abegunde DO, Mathers CD, Adam T, Ortegon M, Strong K. The burden and costs of chronic diseases in low-income and middle income countries. *Lancet* 2007;**370**:1929-1938.
- Ghaffar A, Reddy KS, Singhi M. Burden of non-communicable diseases in South Asia. *BMJ* 2004;**328**:807-810.
- McKeigue PM, Miller GJ, Marmot MG. Coronary heart disease in South Asians overseas: a review. *J Clin Epidemiol* 1989;**42**:597-609.

6. Chobanian AV, Bakris GL, Black HR, et al. The seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: the JNC 7 report. *J Am Med Assoc* 2003;**289**:2560-2572.
7. Saleheen D, Frossard P. CAD risk factors and acute myocardial infarction in Pakistan. *Acta Cardiol* 2004;**59**:417-424.
8. Nishtar S. Prevention of coronary heart disease in South Asia. *Lancet* 2002;**360**:1015-1018.
9. Pakistan Medical Research Council. Non-Communicable Risk Factor Survey Pakistan 2014-15 conducted by Pakistan Health Research Council Islamabad.
10. Borghi C, Veronesi M, Dormi A, Ambrosioni E. P-464: hypercholesterolemia and progression of high-normal blood pressure to hypertension. *Am J Hypertens* 2003;**16**:207A-207A.
11. Beunza JJ, Martinez-Gonzalez MA, Ebrahim S, Bes-Rastrollo M, Nunez J, Martinez JA, Alonso A. Sedentary behaviors and the risk of incident hypertension: the SUN cohort. *Am J Hypertens* 2007;**20**:1156-1162.
12. Hamburg NM, McMackin CJ, Huang AL, Shenouda SM, Widlansky ME, Schulz E, Gokce N, Ruderman NB, Keaney JF, Vita JA. Physical inactivity rapidly induces insulin resistance and microvascular dysfunction in healthy volunteers. *Arterioscler Thromb Vasc Biol* 2007;**27**:2650-2656.