

May Measurement Month 2021: an analysis of blood pressure screening results from Pakistan

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KEYWORDS

Awareness;
Blood pressure;
Control;
Hypertension;
Screening

A worldwide screening initiative called May Measurement Month is held every year with the goal of raising both public and individual awareness of checking blood pressure (BP) and its control. A total of 11 366 volunteer adults (≥ 18 years) were screened in Pakistan. The mean age of the study population was 47.1 ± 13.2 years and 83.8% were male. Of the 6615 (58.2%) participants with hypertension, 69.1% were aware and 4233 (64.0%) were on antihypertensive medication. Of all participants on antihypertensive medication, 41.9% had controlled BP (140/90 mmHg). Of participants with hypertension, only 26.8% had controlled BP. Of the 7133 participants not on antihypertensive medication, 2382 (33.4%) were found to be hypertensive. In Pakistan, the proportion of hypertension and uncontrolled BP remains high, suggesting a widespread lack of adopting healthy lifestyle choices, sufficient healthcare facilities, awareness of checking their BP, and also inadequate management of hypertension.

Introduction

Around the world, raised blood pressure (BP) is the most prevalent non-communicable condition and the best indicator of cardiovascular diseases. Self-care behaviour change is considered essential to avoid problems connected to hypertension.¹ Based on the results of a meta-analysis, the risk factors found frequently reported and significantly associated with hypertension in Pakistan include urbanization, obesity, overweight, gender, physical activity, age, education, tobacco use, diabetes mellitus, and family history of hypertension.² Raised BP has become a common medical ailment worldwide, despite the fact that country prevalence rates vary, based on the economy, social habits, and the population's

degree of healthcare knowledge. Pakistan is a developing country and is going through fast epidemiologic as well as demographic changes and unfavourable economic conditions with unhealthy lifestyles contributing to an increased proportion of hypertension.³ A recent large community-based epidemiological survey has revealed the prevalence of hypertension in Pakistan as 46.2%.⁴ A study including patients from three hospitals has reported the prevalence of hypertension as 32.4% in males and 34% in females.⁵ For the purpose of controlling BP and spreading awareness, the Pakistan Hypertension League (PHL), as a member of the International Society of Hypertension, got involved with the May Measurement Month (MMM) global BP campaign in 2017. The objective of this study is to raise awareness about the importance of measurement and the control of BP. In MMM17, the mean age of the participants was 45.0 ± 11.6 years with 55.2% of participants found to be hypertensive,⁶ and in

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Table 1 Total participants and proportions with hypertension, awareness, on medication, and with controlled blood pressure

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
11 366	6615 (58.2)	4571 (69.1)	4233 (64.0)	1775 (41.9)	1775 (26.8)

The number (%) reporting a previous COVID-19 positive test was 388 (3.4%).

MMM18, the mean age of the participants was 44.6 ± 14.6 years, and 58.7% were hypertensive.⁷ In MMM19, a lower proportion of 52.1% of participants was found to have hypertension.⁸ In 2021, Pakistan again took part in the MMM campaigns, and here, we report on the findings.

Methods

This cross-sectional survey was conducted in May 2021. The screening sites were hospitals, outdoor medical camps, and workplaces in different cities and towns of Pakistan. The screenees were recruited by public messages via mobile phones. After obtaining informed consent from the participant, trained healthcare workers took BP measurements of adults ≥ 18 years old, by using clinically validated digital upper arm BP devices using a medium cuff size of 22–32 cm [OMRON healthcare (Kyoto, Japan)]. Three successive sitting BP readings were recorded after 5 min rest. Blood pressures were taken by healthcare workers who were trained by qualified medical doctors. A detailed medical history including sex, age, use of antihypertensive medicines, when last BP was checked, COVID-19 test results, and usage of statins and aspirin was taken from the participants and entered into a predesigned proforma provided by the MMM team. Hypertension was defined as a systolic BP ≥ 140 mmHg and/or diastolic BP ≥ 90 mmHg as determined by the mean of the second and third readings and/or taking antihypertensive medication. Controlled BP was defined as being on antihypertensive medication with a BP $< 140/90$ mmHg.⁹ Data were analysed centrally by the MMM project team, and multiple imputations were performed, if BP readings were missing.¹⁰

Results

A total of 11 366 adults were screened (Table 1). The mean age of the study population was 47.1 ± 13.2 years. Most (83.8%) were male, all participants were of South Asian ethnicity, and 4057 (35.7%) had never had their BP measured before. Mean BP was 131.9/85.0 mmHg.

A total of 6615 (58.2%) participants had hypertension, of whom 69.1% were aware, 4233 (64.0%) were on antihypertensive medication, and 26.8% had controlled BP. Of those on antihypertensive medication, 41.9% had controlled BP. Of the 7133 participants not on antihypertensive medication, 2382 (33.4%) were found to be hypertensive. Hypertension was more commonly found in men (59.4%) compared with women (52.1%) but with similar awareness, treatment, and control rates. There was a strong gradient of increasing hypertension with age, from 34.9% in those aged 18–29 years to 71.8% in those aged 60–69 years.

Discussion

In the study population of MMM21, 58.2% were classified as hypertensive. Although the proportion of those with hypertension who were aware was 69.1% and 64% were treated, only 26.8% overall were controlled to $< 140/90$ mmHg. The low proportion of hypertensives controlled emphasizes the importance of educating the population about lifestyle and risk factors linked to hypertension risk and BP control. The observed prevalence of hypertension in this analysis is in line with estimates observed in previous campaigns: 55.2% in MMM17, 58.7% in MMM18, 52.1% in MMM19, and 58.2% in MMM21.^{6–8} Similarly, results from the National Survey of Pakistan revealed a prevalence of hypertension as 46.2%.⁴ The proportion screened who had never had their BP measured before has decreased from previous surveys, from 47.1% in 2019 to 35.7% in 2021. However, an important limitation of the MMM results is that participants were recruited through convenience sampling and so estimates are not nationally representative.

Conclusions

The COVID-19 pandemic significantly affected the whole world. In particular, healthcare workers were on the frontline, and they were psychologically distressed, and as a result, it was difficult to carry out the MMM campaign during the COVID-19 pandemic in Pakistan. However, the MMM campaign in Pakistan has always been helpful in identifying new undiagnosed cases and inadequately treated hypertension as well as in increasing hypertension awareness among study participants and we aim to continue carrying out campaigns in the future.

Acknowledgements

This study is acknowledged to volunteer physicians, MMM staff, and participants across all the screening sites in Pakistan. We are also grateful to Highnoon Laboratories Ltd. for facilitating the survey by providing equipment and volunteers to various screening sites. Highnoon had no role in the study design, data collection, analysis, interpretation, or writing of the manuscript.

Funding

None declared.

Conflict of interest: none declared.

Data availability

Data available on request.

References

1. Ajani K, Gowani A, Gul R, Petrucka P. Levels and predictors of self-care among patients with hypertension in Pakistan. *Int J Gen Med* 2021;**14**: 1023-1032. Published 2021 Mar 25.
2. Riaz M, Shah G, Asif M, Shah A, Adhikari K, Abu-Shaheen A. Factors associated with hypertension in Pakistan: a systematic review and meta-analysis. *PloS One* 2021;**16**:e0246085.
3. Mubarik S, Malik SS, Mubarak R, Gilani M, Masood N. Hypertension associated risk factors in Pakistan: a multifactorial case-control study. *J Pak Med Assoc* 2019;**69**:1070-1073.
4. Basit A, Tanveer S, Fawwad A, Naeem N; NDSP Members. Prevalence and contributing risk factors for hypertension in urban and rural areas of Pakistan; a study from second National Diabetes Survey of Pakistan (NDSP) 2016-2017. *Clin Exp Hypertens* 2020;**42**:218-224.
5. Rehman MA, Ashfaq K, Sohail N, Ghaffari MA, Ali N. Prevalence and role of risk factors for hypertension in 18-70 years of age in rural and urban areas of District Sahiwal, Punjab Pakistan. *Pak J Health Sci* 2022;**3**: 175-178.
6. Ishaq M, Memon F, Beaney T, Xia X, Kobeissi E, Poulter NR. May Measurement Month 2017: an analysis of the blood pressure screening campaign results in Pakistan-South Asia. *Eu Heart J Suppl* 2019;**21**:D89-D91.
7. Memon FS, Wang W, Beaney T, Bai K, Poulter NR, Ishaq M. May Measurement Month 2018: an analysis of blood pressure screening results from Pakistan. *Eur Heart J Suppl* 2022;**24**:F31-F33.
8. Memon F, Beaney T, Clarke J, Ishaq M, Bai K. May Measurement Month 2019: an analysis of blood pressure screening results from Pakistan-South Asia. *Eur Heart J Suppl* 2021;**23**:B117-B119.
9. Beaney T, Schutte AE, Stergiou GS, Borghi C, Burger D, Charchar F *et al.* May Measurement Month 2019: the global blood pressure screening campaign of the International Society of Hypertension. *Hypertension* 2020;**76**:333-341.
10. Beaney T, Wang W, Schlaich MP, Schutte AE, Stergiou GS, Alcocer L *et al.* Global blood pressure screening during the COVID-19 pandemic: results from the May Measurement Month 2021 campaign. *J Hypertens* 2023;**41**:1446-1455. Epub 2023 Jun 19. PMID: 37337866; PMCID: PMC10399936.