



Editorial

Blood pressure - Methods to record & numbers that are significant: Lets make a tailored suit to suit us

'India should walk on her own shadow- we must have our own development model'

-APJ Abdul Kalam

Hypertension is a major global public health problem. It affects 1.13 billion individuals and accounts for 45 per cent of all heart disease related deaths and 50 per cent of all stroke related deaths worldwide¹. India with a population of 1.32 billion contributes a large part of this burden. While we need to think globally, we shall have to act locally and nationally since some issues with hypertension are different in our country due to our unique genetic, social, economic, dietary and other lifestyle factors.

Hypertension in India has some special features such as onset occurs relatively early in life, a rural-urban divide, the prevalence in urban areas is 33.8 per cent and in rural areas, it is 27.6 per cent with an overall prevalence of 29.8 per cent². There is a clustering of multiple cardiovascular risk factors in Indians, and there is also a significant seasonal variation of blood pressure (BP). The average BP in general population has been rising in the last two decades as against a decrease seen in some western countries². Furthermore, the awareness of hypertension is 42 per cent in urban and 25 per cent in rural individuals. The treatment is taken by 38 per cent urbans and 25 per cent rurals². Only 20 per cent of urbans and 11 per cent of rurals have control of BP². This is much less than the figures in other nations like in the US where awareness, treatment and control are 81, 74 and 53 per cent, respectively³.

The health care delivery system in our country is also different as we spend four per cent of our gross domestic product on health which is half of the world average⁴. Only 25 per cent of Indians have some form of insurance,

and 80 per cent of outpatient department visits are taken care by the private sector⁴. For all these reasons, we will have to find our own ingenious and indigenous solutions to this huge problem according to our circumstances.

Going by the simple theme of World Hypertension Day 'Know your numbers' there are two issues which have come up more recently especially for us in India that complicate the attempted simplification of this core message. The sooner we clarify these, the easier and faster will our efforts to control this highly prevalent 'risk factor-disease' become.

The first is regarding the apparatus to be used to know the numbers. The simple measuring device that we used for a century is now in a state of uncertainty⁵. The mercury sphygmomanometer has been phased out from most parts of the world. The WHO has taken it as a mission to phase out mercury apparatus by 2025⁶. This is required and has to be done to prevent the cumulative toxic effects of mercury. There is a need to develop uniform, reliable, accurate and reproducible method for measurement of BP. We do recognize that we need to shift to aneroid and oscillometric digital BP measuring devices. However, both these devices require periodic calibrations which were required less often with mercury. We also do not have any BP calibration laboratories across the country, and so it all depends on individual users and physicians to check its reproducibility and reliability. There are no guidelines for BP apparatus manufacturers and their accreditation. A system needs to be developed in India as is existent in Europe, Britain and America. In fact, for the sake of uniformity US Association for the Advancement of Medical Instrumentation, the British Hypertension Society, the European

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Society of Hypertension have collectively formed a group for giving guidelines regarding instrument manufacturing and standardization⁷.

The latest Canadian guidelines advocate the use of automated office BP (AOBP) for diagnosis of hypertension⁸. The SPRINT (Systolic Blood Pressure Intervention Trial) study⁹ also used this method, and the latest American College of Cardiology/American Heart Association (ACC/AHA) guidelines on hypertension¹⁰ are based on data from trials with these instruments. These instruments are much more expensive, none is being manufactured in India and are less likely to be widely used here. Thus, we need to develop methodologies and systems for the standard of equipment manufactured and available for a physician in our country.

The second issue that has cropped up is, once we 'know the numbers' what significance do we attach to these. The very definition of hypertension which for the last 30 years was globally accepted as 140/90 mmHg has been challenged by the ACC/AHA guidelines released last year¹⁰. No other recent national guidelines (Canadian 2017⁸ and Australian 2016¹¹) have changed the definition to 130/80 mmHg which is the new definition by the ACC/AHA guidelines¹⁰. In India, we already have two Indian guidelines, the more popular Indian Guidelines on Hypertension (IGH) III-2013 (third in a series, 2001 and 2007 were the first and second) which have been jointly drafted and accepted by the Association of Physicians of India (API) and Hypertension Society of India (HSI) and endorsed by the Cardiological Society of India and Indian Medical Association¹². The other Indian guidelines are the more recent 'Standard Treatment Guidelines' released by the Ministry of Health and Family Welfare in May 2016¹³. These guidelines have come up after the SPRINT study but have retained the definition of hypertension as 140/90 mmHg and graded it I, II and III with increments of 20 mm in systolic and 10 mm in diastolic BP. This grading is same as in the IGH-III by API/HSI.

The SPRINT study is the basis for this reclassification and new targets by the ACC/AHA. We have no idea what will be the conversion factor for physician recorded office BP (PROBP) which is done in India to the AOBP recording (which was used in the SPRINT). Some experts feel it could be 10-15 mmHg higher for the PROBP¹⁴. This brings us closer to the existing targets. Greater control will mean larger number of drugs and consequently increased cost and

frequent investigations to look at side effects. Our emphasis here should be to include greater number of individuals with hypertension in terms of its awareness and subsequent control as a nation since that will impact morbidity and mortality to a larger extent. The Indian experts would prefer a target of 135/85 mmHg as used by Canadians⁸.

The new ACC/AHA guidelines¹⁰ will, however, impact care in our region also, for the following reasons: First, since these have drawn the attention of policymakers, physicians and the general public that good control of BP means reduced mortality. Second, a common notion for a long time that was further supplemented by the 8th Joint National Committee (JNC 8)¹⁵, that in elderly we should accept higher targets will now be changed, and hopefully, elderly (>75 yr) who derive even greater benefits will have better control. The SPRINT study and ACC/AHA guidelines used 10 years atherosclerotic cardiovascular disease (ASCVD) risk calculator which has not been validated for Indian population^{9,10}. Thus, in India we need to develop our own risk calculation scoring system. A comparison of the ACC/AHA guidelines and the two Indian guidelines is shown in Table.

A general practitioner who manages most patients of hypertension may be confused regarding the best, safe and most reliable instrument to be used today as also the definition and targets for BP control. We need to take steps in this direction in a collective form, develop BP apparatus manufacturing and validation guidelines and facilities that are widely available, cost-effective and can be used by single physician and public/private hospitals both. At the same time, we should put emphasis on better control, involvement of patients in the treatment process, greater use of home BP recordings and an 'individualized care approach' to the management of hypertensive patients aimed at 'overall risk reduction' and consequently target organ effects. We should be moving to an individualized care in which the patient profile (race, age, risk factors, associated diseases & target organ damage) and the BP value will both have an equal effect on choice and need for antihypertensive medications and the targets to be achieved. Let us also untangle some of these knots and project the evidence base in a simplistic manner that can be translated into practice regarding definitions and targets of BP for our country by forming collective guidelines.

Conflicts of Interest: None.

Table. A comparison of the American College of Cardiology (ACC)/American Heart Association (AHA), Indian Guidelines on Hypertension (IGH) Guidelines by Association of Physicians of India (API)/Hypertension Society of India (HSI) and the Ministry of Health and Family Welfare (MoHFW) guidelines

| Parameters | 'ACC/AHA HTN guidelines' ¹⁰ | 'IGH III' by API/HSI ¹² | 'Standard treatment Guidelines' by MoHFW ¹³ | Comments |
|-------------------------------|--|--|--|--|
| Year | 2017 | 2013 | 2016 | MoHFW guidelines after the SPRINT trial |
| Definition of HTN (mmHg) | >130/80 | >140/90 | >140/90 | The two Indian guidelines use similar values for definition and grading of HTN |
| Classification | | | | |
| 120-129 | Elevated | Normal | Normal | |
| 130-139 | Stage I HTN | High normal | High normal | |
| ≥140 | Stage II HTN | Grade I HTN | Grade I HTN | |
| Target BP on treatment (mmHg) | 130/80 | 140/90; for elderly: 140-145/90 | 140/90; For ≥80 yr: 150/90 | Some recent guidelines from other countries accept target of 135/85 |
| Clinic BP apparatus | Mercury apparatus not mentioned at all | Mercury apparatus to be discouraged | Mercury apparatus can be used | MoHFW needs to change as mercury is being phased out |
| Home BP | To be used | To be encouraged | Not to be used | Home BP is now used worldwide |
| AOBP | To be used | No mention | No mention | Not available in India |
| Daily salt intake recommended | 3.75 g/day | 6 g/day | 5 g/day | Indian diet contains 8.5 g salt per day at present ¹⁶ |
| Drug class of initial choice | ARBs ACEIs CCB Diuretics | ARBs, ACEIs, CCB, diuretics, beta blockers - young and in special circumstances | ACEIs, CCB, diuretics, beta blockers | ARBs not recommended as first line by MoHFW due to cost |

AOBP, Automated office BP; ACEIs Angiotensin converting enzyme inhibitors; ARBs, angiotensin receptor blockers; CCB, calcium channel blockers; HTN, hypertension

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References

- Gupta R, Mohan I, Narula J. Trends in coronary heart disease epidemiology in India. *Ann Glob Health* 2016; 82 : 307-15.
- Anchala R, Kannuri NK, Pant H, Khan H, Franco OH, Di Angelantonio E, *et al.* Hypertension in India: A systematic review and meta-analysis of prevalence, awareness, and control of hypertension. *J Hypertens* 2014; 32 : 1170-7.
- Joffres M, Falaschetti E, Gillespie C, Robitaille C, Loustalot F, Poulter N, *et al.* Hypertension prevalence, awareness, treatment and control in national surveys from England, the USA and Canada, and correlation with stroke and ischaemic heart disease mortality: a cross-sectional study. *BMJ Open* 2013; 3 : e003423.
- Healthcare in India: Current state and key imperatives. Available from: <https://www.gita.org.in/Attachments/Reports/AHPI-Healthcare-India.pdf>, accessed on April 30, 2018.
- O'Brien E. Demise of the mercury sphygmomanometer and the dawning of a new era in blood pressure measurement. *Blood Press Monit* 2003; 8 : 19-21.
- Evers DC, Keane SE, Basu N, Buck D. Evaluating the effectiveness of the Minamata Convention on Mercury: Principles and recommendations for next steps. *Sci Total Environ* 2016; 569/570 : 888-903.
- Stergiou GS, Alpert B, Mieke S, Asmar R, Atkins N, Eckert S, *et al.* A universal standard for the validation of blood pressure measuring devices: Association for the Advancement of Medical Instrumentation/European Society of Hypertension/International Organization for Standardization (AAMI/ESH/ISO) Collaboration Statement. *J Hypertens* 2018; 36 : 472-8.

8. Leung AA, Daskalopoulou SS, Dasgupta K, McBrien K, Butalia S, Zarnke KBL, *et al.* Hypertension Canada's 2017 Guidelines for Diagnosis, Risk Assessment, Prevention, and Treatment of Hypertension in Adults. *Can J Cardiol* 2017; 33 : 557-76.
9. Wright JT Jr, Williamson JD, Whelton PK, Snyder JK, Sink KM, Rocco MV, *et al.* SPRINT Research Group. A randomized trial of intensive versus standard blood-pressure control. *N Engl J Med* 2015; 373 : 2103-16.
10. Whelton PK, Carey RM, Aronow WS, Casey DE Jr., Collins KJ, Dennison Himmelfarb C, *et al.* 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA guideline for the prevention, detection, evaluation, and management of high blood pressure in adults: Executive summary: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. *Hypertension* 2018; 71 : 1269-324.
11. National Heart Foundation of Australia. *Guideline for the diagnosis and management of hypertension in adults - 2016*. Available from: https://www.heartfoundation.org.au/images/uploads/publications/PRO167_Hypertension-guideline-2016_WEB.pdf, accessed on April 30, 2018.
12. Association of Physicians of India. Indian guidelines on hypertension (I.G.H.) – III 2013. *J Assoc Physicians India* 2013; 61 : 6-36.
13. National Health Mission. Ministry of Health & Family Welfare, Government of India. *Standard Treatment Guidelines*. Available from: <http://www.nhm.gov.in/nrhminstate/520-standard-treatment-guidelines.html>, accessed on April 30, 2018.
14. Myers MG, Godwin M, Dawes M, Kiss A, Tobe SW, Kaczorowski J. Measurement of blood pressure in the office: recognizing the problem and proposing the solution. *Hypertension* 2010; 55 : 195-200.
15. James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, Handler J, *et al.* 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8). *JAMA* 2014; 311 : 507-20.
16. Kumbala D, Dharmalingam M, Dalvi K, Ray S, Shah MK, Gupta S, *et al.* A Study of salt and fat consumption pattern in regional Indian diet among hypertensive and dyslipidemic patients - SCRIPT study. *J Assoc Physicians India* 2016; 64 : 47-54.