Repeated versus single blood pressure measurement

Jose AP, Awasthi A, Kondal D, Kapoor M, Roy A, Prabhakaran D. (Centre for Chronic Conditions and Injuries, Public Health Foundation of India, Gurugram, Haryana; Economics and Planning Unit, Indian Statistical Institute, Delhi; Department of Cardiology, All India Institute of Medical Sciences, New Delhi, all in India; London School of Hygiene and Tropical Medicine, London, UK.) Impact of repeated blood pressure measurement on blood pressure categorisation in a population-based study from India. *J Hum Hypertens* 2019;**33:**594–601.

SUMMARY

Blood pressure (BP) in conventional clinical settings is usually recorded based on a single measurement. However, all guidelines including the European Society of Hypertension (ESH) and the European Society of Cardiology (ESC) recommend considering the average of the last two of three consecutive BP readings taken 1–2 minutes apart as the final clinical BP of the patient. This article aimed to highlight and quantify the issues associated with the conventional clinical practice of using single BP measurements as opposed to the recommended guidelines.

To quantify the impact of assigning BP status through the conventional practice versus the recommended guidelines, this study analysed the data obtained from the National Family Health Survey-4. The survey recorded three BP measurements for each patient, with at least 5 minutes between each measurement and 5 minutes of quiet sitting before the first measurement. These data were analysed in this study, and the median difference in systolic BP (SBP) and diastolic BP (DBP) as well as the prevalence of hypertension was calculated. Furthermore, based on the thresholds detailed in the ESC and ESH guidelines, this study compared the hypertension classification of patients based on the first BP reading versus the mean of two or more BP readings.

The first BP readings for patients were the highest in comparison to the average of two or more readings. The authors reported that there was a decrease of 3.6 mmHg in mean SBP and 2.4 mmHg in mean DBP when considering the average of the second and third BP readings (as per the recommended guidelines) in comparison to considering the first reading alone. Furthermore, the prevalence of hypertension was 16.5% when considering the first reading only, whereas it was 10.1% when considering the average of the second and third readings. Therefore, there was a 63% increase in the prevalence of hypertension reported via conventional practice versus the ECS- and ESH-recommended practice.

The authors concluded by recommending multiple BP readings for assigning a BP status to a patient, especially for those categorized as having grade I hypertension or greater, to avoid misclassification and subsequent mistreatment.

COMMENT

Significance of the study findings in the context of hypertension in India

According to the India State-Level Burden of Disease Study, high SBP has been ranked as the number one risk factor in 2016, causing a loss of approximately 3000 disability-adjusted life years per 100 000 people.[1] Furthermore, hypertension accounts for 10.8% of all deaths in India.[2] Given the high burden of hypertension and its consequences, the article by Jose *et al.* is timely and has implications both for practice and policy. This study addresses some of the variabilities in the diagnosis of hypertension by major international guidelines both in terms of number of BP measurements and the number of sittings (single *v.* multiple). While the ESH and ESC recommend averaging the second and third measurements, the American College of Cardiology and American Heart Association recommend taking an average of two or more BP readings over two or more occasions. Jose *et al.* estimate that if the ESC-recommended guidelines were used to assess BP, the new prevalence based on the District Level Household Survey-4 and Annual Health Survey data would be reduced to 19.9%, which corresponds to 46 million people being reclassified from hypertensive to high normal, normal or optimal BP categories. In terms of policy and practice, the resulting overestimation of true BP status can have serious implications in terms of unnecessary prescription of treatment, economic burden on the health system and misinformed focus on national health priorities. The Indian government and several state governments are attempting to reduce the spiralling healthcare costs, and it is imperative to accurately identify those in real need of drug therapy, which this study has shown elegantly. Further, given that the major source of out-of-pocket expenditure for chronic disease care is the outpatient costs of even generic antihypertensive drugs,[3] this study will have a major impact in reducing microeconomic impacts (i.e. costs to the individual and family).

This study has an important message for primary care physicians as well as those who provide care at secondary and tertiary settings. Anecdotally, we know that most physicians measure BP only once given the volume of patients they see in their practices. This study emphasizes the need for more than one measurement and innovative ways of ensuring that this is done. Innovations such as task sharing with nurses or community health workers supported by electronic decision support systems have been demonstrated in various settings and may be an option to ensure multiple measurements of BP.[4] In fact, Jose *et al.* suggest that it may not be needed to measure BP three times in all individuals and to confine this to those with stage I hypertension or greater. Doctors in solo practice who have to measure BP on their own could follow this advice. The authors have argued that uptitration of BP is not expected through repeated measurements, i.e. it is highly unlikely that people with normal BP will be reclassified as having hypertension. In Jose *et al.*'s study, the proportion of uptitration was low (6.2% reclassified from normal to high normal and 0.7% reclassified from normal to grade I hypertension).

This article emphasizes the need for standardization of assessment of hypertension for screening and diagnosis across healthcare settings including research efforts in India. This is one of the many important measures that must be implemented to understand the true prevalence of hypertension, ensure comparability across regional prevalence rates, avoid misclassification and subsequent mistreatment and use appropriate data to inform related policies for national resource allocation.

Conflicts of interest. None declared

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SANJANA BHASKAR
Centre for Environmental Health
Public Health Foundation of India
Gurugram
Haryana

NITISH NAIK
Department of Cardiology
All India Institute of Medical Sciences
New Delhi
nitishnaik@yahoo.co.in