

Global Spotlights

‘Normal’ blood pressure is no longer a safe haven: take shelter under ‘optimal’ blood pressure

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Systemic hypertension remains a constant threat to global health due to its direct contribution to premature morbidity and excessive mortality.¹ The risks associated with hypertension relate to both disease duration and severity. Traditionally, blood pressure (BP) has been categorized as ‘normal’ or ‘abnormal’. This definition of ‘normal’ BP somehow implies a ‘safe’ level in terms of protection against cardiovascular disease (CVD).

However, the concept of ‘normal’ BP and its definition have evolved over time. A long-term study in which a large Chinese cohort ($n = 25\,529$) was followed for 10 years reported that CVD risk varies and increases within the range of ‘normal’ BP.² Over a period of 10 years, the unadjusted risk for CVD for individuals with a baseline BP of 120–129 mmHg was found to be 2.6 times higher than that in those with a baseline systolic BP (SBP) in the lowest category (90–99 mmHg). As individuals with a baseline SBP of 120–129 mmHg were older than those with an SBP of <120 mmHg, risk-adjustment analyses indicated that ‘normal’ BP was not safe with progressive aging. Obviously, aging is inevitable. The question is, can we prevent age-related rises in SBP from 90 to 129 mmHg, as maintaining SBP at 90–120 mmHg despite advancing age appears to be protective against CVD?

Notably, even normal BP has been shown to cause pathological changes in the cardiovascular system. SBP levels typically considered normal have been associated with an increase in coronary artery calcium score, further highlighting the increased risk of vascular disease at BP levels that are not in the range of ‘traditional’ hypertension.³

Several population-based studies have demonstrated that SBP levels currently considered normal (<130 mmHg) are not safe, and in fact, there is a graded increase in CVD risk as SBP increases beyond 90 mmHg.^{4–7} Whelton *et al.*⁶ found that the amount of coronary artery calcium and the risk of incident atherosclerotic CVD increase with increasing SBP levels, even in individuals with SBP 90–120 mmHg. In fact, mounting evidence has made it abundantly clear that so-called high normal BP levels (120–129 mmHg) are associated with a significant

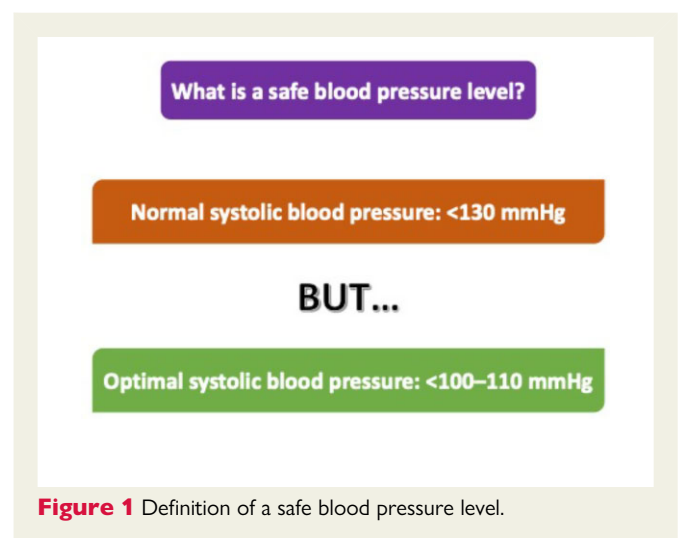


Figure 1 Definition of a safe blood pressure level.

increase in incident CVD compared with SBP levels of 90–100 mmHg. This connection may be much more pronounced in yet to be identified subgroups. This means that CVD risk starts even when SBP is a long way below 130/80 mmHg, which is the current threshold used to diagnose and define hypertension.⁸ Therefore, the guideline-based definition of normal BP does not provide freedom from CVD risk. Without a doubt, SBP of 120–130 mmHg is a harbinger of significant chronic disease burden and portends a poor prognosis. Overall, CVD risk appears to be independently associated with SBP levels, starting at 90 mmHg.

In addition, there has been a large shift in the perception towards white-coat hypertension (WCH) in the last two decades. Once believed to be an innocent phenomenon that does not carry any greater risk of poor cardiovascular outcomes compared with ‘normal’ BP levels,

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WCH has now been linked to unfavourable metabolic risk factor profiles, a higher incidence of asymptomatic organ damage, and a greater risk of progression to high cardiovascular morbidity and mortality.⁹ This further calls into question what we consider 'normal' BP levels.

Even in the absence of any co-existing risk factors, subjects without a diagnosis of hypertension would benefit from having their BP lowered to well below 115/75 mmHg. While the estimates are speculative, there is enough scientific evidence strongly supporting the concept of 'optimal' BP rather than 'normal' BP. Future guidelines and policies should be substantially modified to advocate optimal BP as the standard, instead of normal BP as currently defined.

The biological risk associated with a given BP level should perhaps be correlated with indices such as left ventricular mass and levels of N-terminal pro B-type natriuretic peptide and high-sensitive cardiac troponin T. However, obtaining these data in clinical practice is expensive, although it could become cost-effective in the future. Furthermore, lowering BP to a new normal—'optimal' BP—requires urgent global action to achieve the primary prevention of CVD (Figure 1). Until that lofty goal becomes a realistic possibility, normal BP is no longer a safe haven.

Acknowledgements

None declared.

Data availability

None declared.

Conflict of interest

The author has been a scientific, academic, educational, and research advisor to USV Private Limited, IPCA Laboratories, and Mankind Pharma.

These advisory relationships are not pertinent within the purview of this manuscript.

Funding

None declared.

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