

NEW DIMENSION SERIES

Sustainable Development Goals (SDGs) for Hypertension Zero in the era of Anthropocene.

CATEGORIES A, B & C

Beyond medicine: tackling social determinants for improved hypertension and cardiovascular care



ANQI ZHU AND TAZEEN H. JAFAR

Program in Health Services & Systems Research, Duke-NUS Medical School, Singapore & Duke Global Health Institute, Duke University, USA.

High blood pressure (BP) is a major preventable risk factor for global mortality, causing over 10 million deaths annually.¹ The global prevalence of hypertension has doubled over the past three decades, disproportionately affecting low- and middle-income countries (LMICs) where less than 20% achieve BP control.^{2,3} Even though high-income countries (HICs) are generally on the right track, there are still big gaps, especially for folks with low socioeconomic status, living in rural areas, or belonging to racial/ethnic minorities. These gaps boil down to the fundamental factors of social determinants of health (SDOH).

The SDOH are a complex set of factors tied to birthplace, upbringing, residence, and employment, significantly impacting health outcomes such as hypertension and cardiovascular disease (CVD). These include socioeconomic and environmental structures, coupled with poor access to quality healthcare, affecting both community and individual health. Housing quality, neighborhood poverty, financial distress, food security, access to green spaces, transportation, conflicts, pollution, racism and segregation contribute to psychosocial stress and anxiety, leading to unhealthy behaviors. Stress increases vulnerability to hypertension and cardiometabolic disorders. Limited access to

affordable, high-quality healthcare exacerbates these challenges, hindering timely diagnosis and treatment, accelerating the progression of vascular disease, and increasing morbidity and mortality.

Between 1990 and 2019, hypertension-related disability-adjusted life years decreased in HICs but rose in LMICs. Overall CVD trends have declined in HICs, including the United States (US), with the most affluent group and whites experiencing the steepest drop. However, substantial socioeconomic and racial disparities persisted, as evidenced by the increased prevalence of stroke and congestive heart failure in less affluent populations, especially among Blacks.⁴ Similar trends in coronary heart disease mortality were also observed in other HICs.⁵ The impact of SDOHs on hypertension and CVD became even more evident during the COVID-19 pandemic, which has affected the socially disadvantaged group the most. The widening health disparities worldwide are concerning and demonstrate that the most significant opportunities to reduce disability and death from hypertension and CVD lie in addressing the health disparities caused by SDOH.

To tackle cardiovascular health disparities, we need everyone on board — patients, healthcare

providers, the health system, policymakers, and the whole community. It's a team effort at different levels. While wiping out all social and environmental disparities is tough, teaching stress management techniques, especially for those facing social challenges, can make a positive impact on cardiovascular health.^{6,7} Making sure everyone has the medications they need, expanding social insurance, and improving transportation options can really boost healthcare access for those who face social disadvantages.

Starting preventive measures early with school-based interventions for kids and teens is key to promoting cardiovascular health from the get-go. Also, targeting socially disadvantaged individuals, connecting them with community support, and factoring in SDOH in cardiovascular risk predictions and treatment plans can really make a difference in improving outcomes for cardiovascular health.

To bring SDOH into hypertension care, evidence suggests that we should switch to non-traditional, team-based care, especially in places with limited resources, using community health workers. Platforms already in place for maternal and child health and infectious disease care can be used to screen and treat hypertension opportunistically. Meanwhile, augmenting healthcare infrastructure with digital tech helps gather crucial info to target and innovate around modifiable SDOH. Keeping the community engaged and empowered is vital for the long-term success of these efforts.^{8,9}

Although neglected over the years, there have been recent efforts focusing on SDOH when it comes to preventing and managing hypertension and CVD. Many organizations, like the World Health Organization (WHO), are stepping up efforts to tackle health disparities globally. For the first time ever, the WHO has released the Global Report on Hypertension in collaboration with Resolve to Save Lives.¹⁰ The International Society of Hypertension (ISH) introduced the annual May Measurement Month campaign as an extension of World Hypertension Day to raise BP awareness on a global scale.^{11,12} Initiatives like Healthy People 2030 (US) and CORE20PLUS5 (UK) identify priorities to reduce health disparity.¹³ More recently, a Global Hypertension Care Task Force to be jointly led by WHO, ISH, and other professional societies was

proposed with the goals of reducing inequities in hypertension care at national and global levels.¹¹

It is now time for concerted efforts to leverage our understanding of the mechanisms of SDOHs and develop a collaborative approach to address health disparities in hypertension and CVD that are aligned with the Sustainable Development Goals 3.4.

References:

1. Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D, Ramirez A, Schlaich M, Stergiou GS, Tomaszewski M, et al. 2020 International Society of Hypertension Global Hypertension Practice Guidelines. *Hypertension*. 2020;75:1334-1357. doi: 10.1161/HYPERTENSIONAHA.120.15026
2. Collaboration NCDRF. Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants. *Lancet*. 2021;398:957-980. doi: 10.1016/S0140-6736(21)01330-1
3. Zhou B, Perel P, Mensah GA, Ezzati M. Global epidemiology, health burden and effective interventions for elevated blood pressure and hypertension. *Nat Rev Cardiol*. 2021;18:785-802. doi: 10.1038/s41569-021-00559-8
4. Abdalla SM, Yu S, Galea S. Trends in Cardiovascular Disease Prevalence by Income Level in the United States. *JAMA Network Open*. 2020;3:e2018150-e2018150. doi: 10.1001/jamanetworkopen.2020.18150
5. Bajekal M, Scholes S, O'Flaherty M, Raine R, Norman P, Capewell S. Unequal trends in coronary heart disease mortality by socioeconomic circumstances, England 1982-2006: an analytical study. *PLoS One*. 2013;8:e59608. doi: 10.1371/journal.pone.0059608
6. Lurbe E, Ingelfinger J. Developmental and Early Life Origins of Cardiometabolic Risk Factors: Novel Findings and Implications. *Hypertension*. 2021;77:308-318. doi: 10.1161/HYPERTENSIONAHA.120.14592
7. Olsen MH, Angell SY, Asma S, Boutouyrie P, Burger D, Chirinos JA, Damasceno A, Delles C, Gimenez-Roqueplo AP, Hering D, et al. A call to action and a lifecourse strategy to address the global burden of raised blood pressure on current and future generations: the Lancet Commission on hypertension. *Lancet*. 2016;388:2665-2712. doi: 10.1016/S0140-6736(16)31134-5
8. Leslie HH, Babu GR, Dolcy Saldanha N, Turcotte-Tremblay AM, Ravi D, Kapoor NR, Shapeti SS, Prabhakaran D, Kruk ME. Population Preferences for Primary Care Models for Hypertension in Karnataka, India. *JAMA Netw Open*. 2023;6:e232937. doi: 10.1001/jamanetworkopen.2023.2937

9. Jeemon P, Harikrishnan S, Ganapathi S, Sivasankaran S, Binukumar B, Padmanabhan S, Tandon N, Prabhakaran D. Efficacy of a family-based cardiovascular risk reduction intervention in individuals with a family history of premature coronary heart disease in India (PROLIFIC): an open-label, single-centre, cluster randomised controlled trial. *Lancet Glob Health*. 2021;9:e1442-e1450. doi: 10.1016/S2214-109X(21)00319-3

10. Global report on hypertension: the race against a silent killer. Geneva: World Health Organization. 2023.

11. Schutte AE, Jafar TH, Poulter NR, Damasceno A, Khan NA, Nilsson PM, Alsaïd J, Neupane D, Kario K, Beheiry H, et al. Addressing global disparities in blood pressure control: perspectives of the International Society of Hypertension. *Cardiovasc Res*. 2023;119:381-409. doi: 10.1093/cvr/cvac130

12. Beaney T, Schutte AE, Stergiou GS, Borghi C, Burger D, Charchar F, Cro S, Diaz A, Damasceno A, Espeche W, et al. May Measurement Month 2019: The Global Blood Pressure Screening Campaign of the International Society of Hypertension. *Hypertension*. 2020;76:333-341. doi: 10.1161/HYPERTENSIONAHA.120.14874

13. Magnani JW. Hypertension-A Social Disease in Need of Social Solutions. *Hypertension*. 2023;80:1414-1416. doi: 10.1161/HYPERTENSIONAHA.123.21296

Tazeen H. Jafar – tazeen.jafar@duke-nus.edu.sg

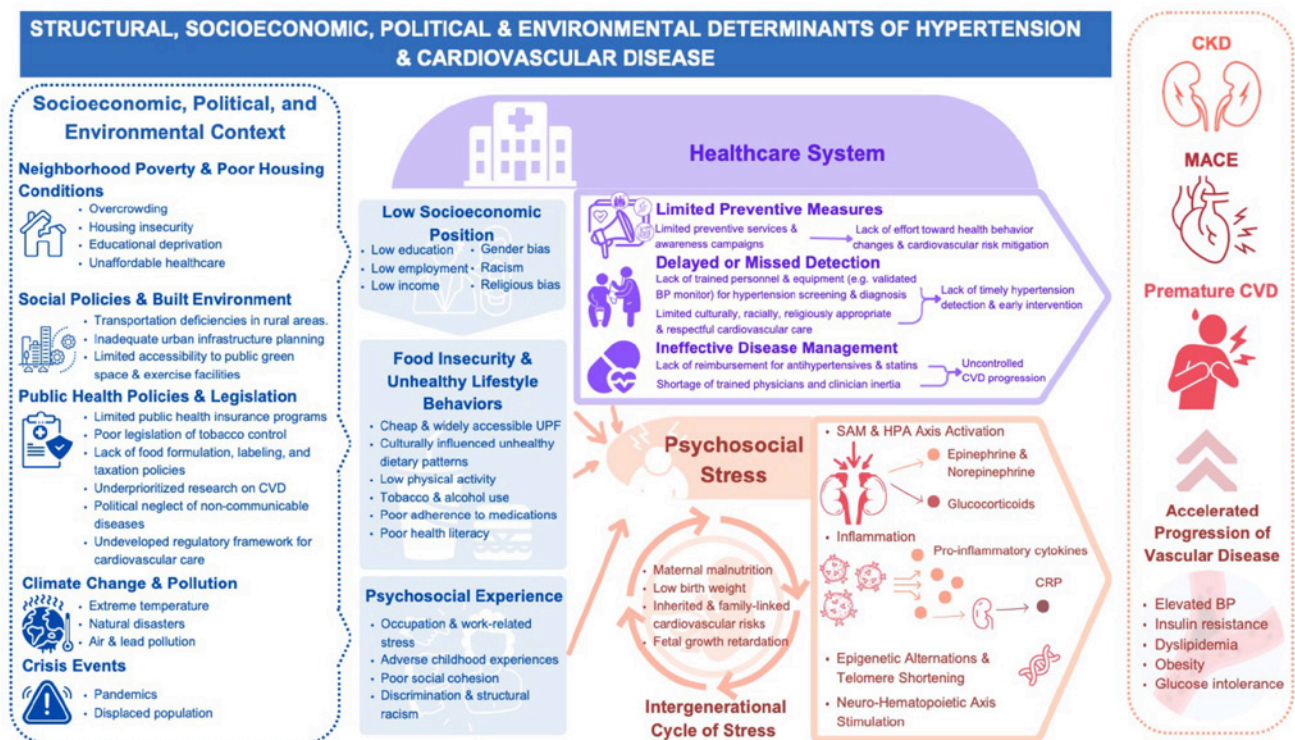


Figure 1 Socioecological and Life Course Approaches of Social Determinants of Health Leading to Hypertension and Cardiovascular Disease. Social determinants of health (SDOHs) encompass socioeconomic, political, and environmental contexts, including neighborhood poverty and poor housing conditions, social policies and built environment, public health policies and legislation, climate change and pollution, and crisis events. These contextual SDOHs contribute to health disparity, reflected in an individual's low socioeconomic position, and subsequently food insecurity, unhealthy lifestyle behaviors, and psychosocial experience. Psychosocial stress generated from SDOHs not only perpetuates itself through the intergenerational cycle of stress, but also triggers biological pathways associated with vascular disease, including the sympathetic-adreno-medullary (SAM) and hypothalamic-pituitary-adrenal (HPA) axis activation, inflammation, epigenetic alternations and telomere shortening, and neuro-hematopoietic axis stimulation. Additionally, SDOHs insert influence through the healthcare system, resulting in limited preventive measure, delayed or missed detection, ineffective disease measurement. These multifaceted interactions culminate in the accelerated progression of vascular disease, ultimately contributing to chronic kidney disease (CKD), major adverse cardiac events (MACE), and premature cardiovascular disease (CVD). BP indicates Blood Pressure; CRP, C-Reactive Protein; UPF, Ultra-Processed Food.