

Paediatric hypertension in South Africa: An underestimated problem calling for action

Hypertension is a major global health problem and the most prominent risk factor for cardiovascular diseases, which disproportionately affect low- and middle-income countries (LMICs). According to a recent report from the World Health Organization/Strategic Advisory Group of Experts (WHO-SAGE) group, almost half of the South African (SA) adult population is living with hypertension.^[1] Although the condition occurs less frequently in children than in adults, evidence now supports the concept that adult essential hypertension has its roots in childhood.^[2,3] A systematic review reports that the prevalence of hypertension in SA children ranges from 7.5% to 22.3%.^[4] One in five children aged 5 years is hypertensive (≥ 95 th percentile for age, height and sex), and 60% of children with elevated blood pressure (BP) (> 90 th percentile for age, height and sex) maintain that status into early adulthood.^[5] In addition, there are distinct BP trajectories set early in childhood that are mainly driven by patterns of early life growth and socioeconomic environment.^[6,7] We seek to raise awareness of paediatric hypertension, its risk factors and its consequences, and highlight the importance of action, which can inform early detection and intervention strategies in the context of an increasing burden of cardiovascular disease in SA.

The aetiology of essential hypertension is complex, and by definition it has no obvious cause such as renal, adrenal or vascular disease. It has been attributed in part to genetic factors, but the recent increase in prevalence of childhood hypertension cannot be due to changes in allele prevalence, but rather implicates the early-life environment,^[8] possibly interacting with a genetic susceptibility. Owing to rapid urbanisation in SA, lifestyle factors known to be prominent predictors of essential hypertension in adults, such as obesity, sedentary behaviour, diet with high calories, salt and fat, are increasingly becoming apparent in children. Nearly half of the variation in systolic BP in 1-year-old SA children from the Birth to Twenty Cohort in Johannesburg could be attributed to maternal BP and early-life factors such as being male, increased body weight, mid-upper arm circumference and length, quantity of formula intake, not having ever been breastfed, and high salt intake.^[9]

Children with raised BP exhibit early markers of vascular and renal injury and are likely to develop hypertension in adulthood. By using non-invasive methods, key pathophysiological changes associated with elevated BP, such as end-organ damage, left ventricular hypertrophy, increased arterial stiffness,^[10] lower glomerular filtration rates and proteinuria, can be detected in childhood.^[11] Studies exploring pathophysiological mechanisms underlying elevated BP in black SA children in the Thusa Bana study in North West Province have shown that high cardiac responsiveness is associated with increased stroke volume, cardiac output and systolic BP.^[12] Arterial stiffness, a surrogate marker of vascular injury, progressively increases from early life and is associated with increased cardiac output and peripheral resistance.^[13] Several studies have reported that elevated BP increases the risk of structural and functional rarefaction in different microvascular beds, and may independently predict the subsequent development of clinical cardiovascular disease in the future.^[14-16]

Clinical guidelines recommend that the diagnosis of hypertension in childhood (≥ 95 th percentile for age, sex and height) needs to be confirmed using triplicate measurements of BP on three different

occasions. However, the feasibility of measurement and evaluation of hypertension status during routine paediatric assessments in an LMIC low-resource setting remains challenging. Health workers need to compute the age-, height- and sex-specific centiles in the clinic setting to ascertain the BP classification of a paediatric patient before discharging them, and to confirm elevated BP on three separate visits. There is emerging evidence to suggest that simplified cut-offs may be sufficient for hypertension screening in children,^[17] but this is not current guideline practice. In addition, the risk-benefit analyses of screening and the cost-effectiveness of therapeutic interventions in children still need to be clarified and evaluated in sub-Saharan Africa to inform policy recommendations. The key question we need to answer is whether we can wait any longer for both international and national definitions of paediatric hypertension based on absolute risk reduction of cardiorenal disease risk by early screening and treatment, before we intervene. SA urgently needs to participate in the ongoing work to establish international BP references and guidelines for children and adolescents worldwide. For example, Tunisia is actively engaging in establishing BP centile charts with six other countries (China, India, Poland, Iran, Korea and the USA).^[18]

Hypertension needs to be detected and managed early in childhood to prevent the associated adverse end-organ changes in later life. Detection of the risk factors underlying elevated BP should therefore start as early as possible. Managing these may be more effective than treatment in reducing the prevalence of hypertension and related health consequences in adulthood. In conclusion, more BP research in SA children is critically needed to provide important epidemiological and aetiological information on paediatric hypertension and its role in the high prevalence of adult hypertension.

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S Afr Med J 2018;108(9):708-709. DOI:10.7196/SAMJ.2018.v108i9.13317