

## ORIGINAL ARTICLE

# Prevalence and associated factors of hypertension among primary school children: A cross-sectional study in Kuching, Sarawak

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### Abstract

**Introduction:** Hypertension is an emerging health concern among children owing to its increasing prevalence and association with obesity. However, hypertension screening is uncommon, and childhood hypertension-related data are limited. This cross-sectional study determined the prevalence and associated factors of hypertension among primary school children in Kuching, Sarawak.

**Methods:** Standard procedures and validated equipment were used to measure blood pressure and anthropometric indicators. The body mass index (BMI)-for-age and waist-to-height ratio (WHtR) were calculated. Questionnaires were used to obtain family sociodemographic data and health history.

**Results:** A total of 1,314 children aged 6–12 years were enrolled, of whom 107 (8.1%) and 178 (13.5%) were hypertensive and pre-hypertensive, respectively. The chi-squared test indicated that hypertension was significantly associated with male sex ( $P<0.05$ ),  $\geq 1$  standard deviation BMI-for-age ( $P<0.001$ ), percentage of excess body fat (BF) ( $P<0.001$ ), 5th to 95th height percentile ( $P<0.001$ ),  $>90$ th excess waist circumference (WC) percentile ( $P<0.001$ ),  $>90$ th WHtR percentile ( $P<0.001$ ), clerical, service, sales and skilled parental work ( $P<0.05$ ), excess weight ( $P<0.05$ ) and cardiovascular disease ( $P<0.01$ ). Multivariate logistic regression analysis showed that the percentage of excess BF [odds ratio (OR): 4.84, 95% confidence interval (CI): 2.01–11.66] and excess WC (OR: 2.33, 95% CI: 1.15–4.72) were significantly related to hypertension after adjusting for sex and age.

**Conclusion:** The prevalence of hypertension among the study population is higher than that among children worldwide. Childhood hypertension-related factors must be identified to aid in routine blood pressure screening, which is crucial for early detection and intervention to reduce future morbidity burden.

### Introduction

Hypertension is an emerging public health concern among children owing to its increasing prevalence and association with adulthood cardiovascular disease.<sup>1</sup> Globally, it affects 2–4% of children. An alarming increase in its prevalence of almost 80% within 15 years starting from the new millennium was noted.<sup>2</sup> Partly owing to the obesity epidemic, the concurrent increase in the prevalence of hypertension and obesity in children has triggered numerous studies to identify the link between both conditions.<sup>3–5</sup> Although the clinical manifestations of atherosclerosis are apparent from middle to late adulthood, the long asymptomatic phase of this pathological process indicates that the cardiovascular event has already begun in early childhood.<sup>6</sup>

The blood pressure (BP) during childhood

can track to adulthood and is influenced by numerous genetic, biological, behavioural, environmental and social determinants. In combination with obesity, these factors interact with each other, making the pathophysiology of hypertension in obesity complex.<sup>7,8</sup>

Hypertension in children is usually asymptomatic until it evolves into the malignant phase or severe organ damage occurs.<sup>9,10</sup> However, identifying hypertension in children is challenging; this condition is often overlooked that many cases remain undetected despite guidelines for screening being available for  $>40$  years.<sup>11–13</sup> Only 26% of children with a high BP consistent with hypertension have been documented in electronic medical records and subsequently diagnosed as hypertensive.<sup>14</sup>

Despite the plethora of studies on childhood