


## Research Article

# Using Anthropometric Indicator to Identify Hypertension in Adolescents: A Study in Sarawak, Malaysia

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This cross-sectional study was conducted to determine the predictive power of anthropometric indicators and recommend cutoff points to discriminate hypertension among adolescents in Sarawak, Malaysia. A total of 2461 respondents aged 12-17 years participated in this study with mean age of  $14.5 \pm 1.50$  years. All anthropometric indicators had significant area under the ROC curve, with body mass index (BMI) and waist circumference (WC) ranging from 0.7 to 0.8. The best anthropometric indicators for predicting hypertension for boys were WC, BMI, and waist-to-height ratio (WHtR). For girls, BMI was the best indicators followed by WHtR and WC. The recommended BMI cutoff point for boys was  $20 \text{ kg/m}^2$  and  $20.7 \text{ kg/m}^2$  for girls. For WC, the recommended cutoff point was 67.1 cm for boys and 68.2 cm for girls. BMI and WC indicators were recommended to be used at the school setting where the measurement can easily be conducted.

## 1. Introduction

Adolescent obesity has become a growing health concern, an epidemic that affects both developing and developed countries [1]. The prevalence has reached to the level that warrant an immediate attention on the primary and secondary prevention of overweight and obesity in children and adolescents. It is during the childhood and adolescents period where they develop their eating and activity pattern that can affect their lifestyle in adulthood. With the current nutritional transition that involved availability of fast foods, soft drinks, sedentary lifestyle, physical inactivity, and increase use of technology related gadgets, many adolescents aged 10-19 years were found to be less active and eat more, resulting with increase of body mass index (BMI) and fat [2]. Such unhealthy trends contributed to the increase of comorbidities such as elevated blood cholesterol, type 2 diabetes mellitus, and hypertension [3].

There were many studies that linked hypertension with overweight and obese among the adolescents. Although the

evidences gathered have a mixed conclusion on the relationship between hypertension and body fat [4], measurement of body fat using anthropometric indicators had proven to be an effective approach in predicting hypertension, particularly in a large population and community-based studies [5]. Beside the use of BMI in assessing nutritional status, other indicators such as waist circumference (WC), waist-height ratio (WHtR), and conicity index (C index) were other common assessment tools where WC measures the overall body fat, WHtR assess the proportion of central fat by height, and C index measures the abdominal fat.

It is not a common practice to screen for hypertension among adolescents in the community routinely. However, detection of high blood pressure plays an important role in control and prevention of hypertension. However, young people are less likely than older adults to be aware of their risk for hypertension and screen for hypertension on their own. Perhaps one of the reasons is that they may think themselves as invincible and unlikely to be at risk for chronic diseases such as hypertension [6]. Provision of healthcare to