Assessment of neck circumference in a sample of primary school children

ABSTRACT

Background: Neck circumference (NC) is one of the proposed assessments for child obesity, but limited information is available for Malaysian children. This study assessed NC and its relationship with anthropometric indices in a sample of primary school children.

Materials and Methods: This cross-sectional study recruited 758 children aged 7-10 years old from a selected primary school in Serdang, Selangor. Anthropometric indices included assessments of height, weight, waist circumference (WC) and NC. Body mass index (BMI) was calculated which was then used to determine BMI-for-age Z-score based on the WHO Child Growth Standard.

Results: Their mean age of the children were 8.2±1.1 years old, mainly boys (54.6%) and Malays/Bumiputera (91.0%). The prevalence of overweight and obesity were 8.3% and 3.8% respectively, lower than the thinness (16.6%). The mean NC was 27.8±2.5cm with no differences between boys and girls. There was a significant difference between BMI and NC in which thinness (25.7±1.3cm) and normal weight (27.6±1.9cm) children had significantly lower NC as compared to overweight (31.6±1.8cm) and obese (32.5±2.5cm) children ($p< 0.001$). However, no different in NC between overweight and obese children. NC was also significantly higher in children with WC of more than 90th percentiles as compared to those less (31.5±2.2 vs 27.2±1.8 cm) ($p< 0.001$). NC was positively correlated with BMI-for-age ($r = 0.781$), BMI-for-age Z-score ($r= 0.762$), WC ($r= 0.755$), body weight ($r= 0.752$), height ($r= 0.430$) and age ($r= 0.117$) ($p< 0.001$). There were a significant relationship of BMI and WC with NC (Adjusted $R^2 = 0.625$, $F_{(2, 753)} = 630.9$ $p < 0.000$).

Conclusion: NC was significantly related to excess weight and adiposity. The results suggest that NC assessments can potentially be used to assess child obesity.

Keyword: Childhood obesity; Neck circumference; Body mass index