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Birth Weight, Nutritional Status and Body Composition among Malaysian Children Aged 7 to 10 Years

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Studies have indicated that lower birth weight is associated with lower body mass index, but the use of birth weight in predicting later nutritional status and adiposity remains inconsistent. Hence, this paper aimed to examine the relationship between birth weight and nutritional status with body composition among Malaysian children. This study is part of the Nutritional Survey of Malaysian Children, which is part of the four-country South East Asian Nutrition Surveys (SEANUTS). Subjects comprising 398 boys and 389 girls from the main ethnic groups, namely Malays, Chinese, Indians, Sabah and Sarawak natives, were recruited using a stratified random sampling. Anthropometric measurements comprised body weight, height, waist circumference (WC) and body fat (BF). Body mass index (BMI), fat mass index (FMI) and fat-free mass index (FFMI) adjusted with height were included, and birth weight was obtained by parental report. Nutritional status such as weight-for-age (WAZ), height-for-age (HAZ) and BMI-for-age (BAZ) were determined using the WHO growth reference for 5–19 years. Physical activity level was assessed using the Physical Activity Questionnaire for Children. Mean birth weight, height, weight, and BF were 3.1 ± 0.5kg, 128.0 ± 8.1cm, 28.4 ± 8.9kg, and $27.9\pm9.1\%$ respectively. Boys (20.4 ± 4.2kg) had higher FFM ($p<0.05$) as compared to girls (19.4 ± 4.9kg). Overall, the prevalence of stunting, underweight and thinness were 6.7%, 9.8% and 6.4%, respectively; while the prevalence of overweight and obesity were higher at 11.9% and 15.6%, respectively. Significant differences between the sexes ($p<0.05$) were found in HAZ (boys: -0.43 ± 0.99; girls: -0.42 ± 1.17) and BAZ (boys: 0.26 ± 1.76; girls: 0.09 ± 1.48). Children born low birth weight (<2.5kg) had lower nutritional status (WAZ:0.59 ± 1.62; HAZ:-0.83 ± 0.96) as compared to those with normal birth weight (WAZ: -0.05 ± 1.62; HAZ: -0.40 ± 1.09) and high birth weight (>4.0kg) (WAZ: 0.51 ± 1.35; HAZ: -0.07 ± 0.67) at $p<0.05$. Besides, there were significant differences in weight, height, BAZ, FFM and FFMI between birth weight groups. Birth weight has weak correlation ($p<0.01$) with FFM ($r=0.22$), WAZ ($r=0.21$), HAZ ($r=0.20$), BAZ ($r=0.18$) and WC ($r=0.14$). After adjusting for covariates, we found that higher birth weight was associated with significant higher values in all anthropometric measurements ($p<0.01$), especially WC ($\beta=2.82$, $p<0.001$). Multiple regression analysis also indicated that birth weight positively predicted later nutritional status; 1kg increase in birth weight predicted 0.70, 0.46, and 0.58 unit increases in WAZ, HAZ, and BAZ, respectively. In conclusion, this study suggests that nutritional status and adiposity are influenced by birth weight. Birth weight is not only an indicator of the nutritional status during infancy, but also a risk factor that affect child growth and development.