Association between Anthropometrics, Body Composition and Bone Parameters in Thai Boys and Girls

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Objective This study aimed to investigate correlations between anthropometrics and body composition with bone parameters of the lumbar spine and whole body in non-obese and obese Thai boys and girls.

Methods This study was performed in 57 boys and 42 girls aged 13.37 $\pm$ 0.52 and 13.29 $\pm$ 0.55 years enrolled in secondary schools in southern Thailand. Subjects were grouped into control group (normal-to-overweight) (BMI $\leq$ 25) and obesity (BMI $\geq$ 27.5). Anthropometric indices for obesity and body composition (BW, BMI, LBM, BFM, %fat, and %lean) were recorded. Bone parameters (BMC, BMD, and Z-scores) of the lumbar spine (L1-L4) and whole body were assessed by DXA. Correlations between anthropometrics, body composition, and bone parameters were evaluated and compared between control and obese groups of boys and girls.

Results Obese girl subjects (BMI = 30.20 $\pm$ 0.52) have higher means of all bone parameters at both sites, while obese boy subjects (BMI = 29.95 $\pm$ 0.50) have higher means of lumbar spine BMC, and whole body BMC and BMD than the control groups of girls and boys respectively (BMI = 22.93 $\pm$ 0.57 and 21.98 $\pm$ 0.65) ($p < 0.01$). In obese girls, BW, BMI and BFM were positive association with lumbar spine BMC ($p < 0.05$), and whole body BMC and BMD ($p < 0.01$). Similarly, in obese boys, BW and BMI were positive correlation with BMC at both lumbar spine and whole body, however BFM and %fat have negative correlations with lumbar spine BMD ($p < 0.01$).

Conclusions BW and BMI can be used as a positive determinant of bone parameters at both lumbar spine and whole body in both boys and girls, however BFM and %fat were negative association with lumbar spine BMD, particularly in obese boys.