Sleep duration modifies effects of free ad libitum school meals on adiposity and blood pressure

**Background:** Insufficient sleep can potentially affect both energy intake and energy expenditure resulting in obesity and reduced cardiometabolic health. Objective: To investigate if habitual sleep duration of 8-11-year-olds modifies the effect of free ad libitum school meals on cardiometabolic markers, body composition, dietary intake, and physical activity. Methods: For two consecutive three-month periods this cluster-randomized, controlled, cross-over trial provided 530 children with school meals or usual lunch brought from home. Dietary intake, activity, and sleep were measured simultaneously for seven consecutive days using dietary records and accelerometers. Short and long sleeping children were defined as lower and upper tertile of sleep duration. Body composition, blood pressure, blood lipids, and homeostatic model assessment of insulin resistance (HOMAIR) were measured/calculated. Results: Overall, school meals compared to lunch from home had positive effects on physical activity and blood pressure in long sleeping children and negative effects on body fat in short sleeping children. Short sleeping children increased fat mass compared to long sleeping children by 0.21 (95% CI 0.03;0.38) kg, android fat mass by 0.02 (0.001;0.04) kg, waist circumference by 0.73 (0.23;1.24) cm, blood pressure by 1.5 (0.4:2.6) mmHg, fat intake by 1.1 (0.2;2.0) energy %, and decreased total physical activity by 7.2 (1.6;12.7) % (all P≤0.04), while HOMAIR and blood lipids were not modified by sleep duration (all P≥0.32). Conclusions: The susceptibility to increase abdominal adiposity and blood pressure when exposed to dietary changes can potentially be explained by too little sleep that results in increased caloric intake and reduced physical activity.

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