

Concurrent Session 4

BMI and waist circumference at 7/8 yr and metabolic profile in adolescence

SP Garnett^{1,2}, LA Baur², S Srinivasan^{1,2}, J Lee¹, CT Cowell^{1,2},

¹Institute of Endocrinology and Diabetes, ²University of Sydney, Discipline of Paediatrics and Child Health, The Children's Hospital at Westmead, NSW 2145

Background - Estimates of the prevalence of overweight and obesity in young people are typically based on body mass index (BMI). However, BMI may not indicate the level of central adiposity. Waist circumference (WC) has therefore been recommended to identify young people at risk of morbidity associated with central adiposity.

Objective - To determine whether sex and age specific WC cut points¹ at 7/8 yr are more effective at predicting elevated metabolic risk (metabolic syndrome) in adolescence compared to recognised BMI cut points.

Design - Anthropometric measurements were taken on 342 children in 1996/97. Seven years later blood pressure (BP) was measured in 270 children and fasting blood samples obtained from 174 of the children for measurement of lipids, glucose and insulin. Metabolic syndrome was defined as the presence of three or more of the following: overweight, high systolic BP, high triglycerides, low HDL cholesterol, high insulin and impaired fasting glucose.

Outcomes - The prevalence of the metabolic syndrome was 17.7%. Being overweight defined by WC (OR 3.6[95% CI: 1.7,8.0], $P=0.002$) at 7/8 yr was more strongly associated with the metabolic syndrome in adolescence compared to BMI (3.0[1.3,7.0], $P=0.007$). Being overweight, as defined by both BMI and WC at 7/8 yr, was also associated with high SBP in adolescence (2.1[1.1,4.2], $P=0.048$ and 2.0[1.1,3.7], $P=0.031$, respectively) but not with triglycerides, glucose or insulin concentrations.

Conclusions - Results from this study demonstrate the value of both WC and BMI at 7/8 yr in predicting an elevated metabolic risk in adolescence. Identifying predictors of risk factor clusters is important; clusters may track more than the individual risk factors.

References

1. Katzmarzyk PT, Srinivasan SR, Chen W, Malina RM, Bouchard C, Berenson GS. Body mass index, waist circumference, and clustering of cardiovascular disease risk factors in a biracial sample of children and adolescents. *Pediatrics*;2004;114: e198-e205.

Resting energy expenditure in 18-20 year old males and females: Validation of indirect calorimetry and Harris-Benedict prediction equation

LJ Riddell, N Dardarian, S McKinney

Deakin University, Burwood VIC 3125, Drexel University, Philadelphia PA 19104, USA

Background - The accurate measurement of Resting Energy Expenditure (REE) is a cornerstone of nutritional assessment. The purpose of this study was to compare two indirect calorimetry methods for measuring REE and the REE estimation obtained by using the Harris-Benedict prediction equation (HBE). The indirect calorimetry methods used were the well validated but expensive metabolic cart, Vmax Spectra (SensorMedics, Yorba Linda, CA) and a commercially available and inexpensive hand-held indirect calorimeter, MedGem (HealthTech Inc. Golden, CO).

Objective - To compare REE measurements obtained from the Vmax Spectra and the MedGem and estimations of REE calculated using the Harris-Benedict Equation.

Design - A convenience sample of seventy six adults (45 women, 31 men)(mean \pm SD), age 19.3 ± 0.1 years, body mass index 22 ± 0.27 (kg/m²) completed duplicate REE measurements using both the MedGem and Vmax Spectra. Subjects were instructed to avoid food and beverage (excluding water), vigorous physical activity and medications for 12 hours prior to measurements. All Vmax measurements were collected in a reclining position following a 30 minute rest period; MedGem measurements were collected in a seated position according to manufacturers' instructions.

Outcomes - Paired t-test results between REE measured using the MedGem hand-held indirect calorimeter showed no significant difference ($P > 0.05$) from the REE measurement using Vmax Spectra metabolic cart. Pearson's correlations were significant between HBE and the two methods of REE measurement ($P < 0.01$). Paired t-test values were significant between the Vmax Spectra results and the HBE prediction equation ($P > 0.05$). The HBE prediction results were statistically similar to REE measured using the MedGem ($P > 0.05$). Compared to the Vmax Spectra results accuracy is lower (38% within $\pm 5\%$ range) than predicted REE using the HBE (88%).

Conclusions - At the group level there is agreement between measured REE using the Vmax Spectra metabolic cart and the MedGem hand-held indirect calorimeter. However, for an individual clinically significant difference in resting energy expenditure would be obtained by the three different methods. Awareness of the limitations of the HBE and portable hand-held indirect calorimeter is invaluable and will help clinicians choose the best method for determining resting energy expenditure for the sampled population. More studies are needed on different groups living under different environmental, economical, and social conditions.