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Traditional and novel correlates of adiposity and cardiometabolic risk among young healthy adults in the North West of England

F. Amirabdollahian[1], C.J. Macdonald-Clarke[1], E.K. Lees[1], T. Harrison[2] and I.G. Davies[2]
[1]*School of Health Sciences, Liverpool Hope University, Liverpool, L16 9JD and* [2]*School of Sports Studies, Leisure and Nutrition, Liverpool John Moores University, Liverpool L17 6BD*

Excessive adiposity is associated with increased cardiometabolic (CM) risk[(1)]. The discriminatory power of traditional proxy indicators of adiposity such as Body Mass Index (BMI), Waist Circumference (WC) and Waist to Hip Ratio (WHpR) has been frequently challenged[(1,2)]. In recent years, several novel proxy measures of adiposity such as Waist to Height Ratio (WHtR)[2], Clinica Universidad de Navarra – Body Adiposity Estimator (CUN-BAE)[(3)] and A Body Shape Index (ABSI)[(4)] and have been suggested as alternatives to the traditional measures. The aim of this study was to investigate which proxy measure of anthropometric adiposity has the strongest association with CM risk indices in healthy young adults in North West England.

After obtaining ethical approval, 396 (171 male and 225 female) participants aged 18–24 years were recruited in a cross-sectional study. Anthropometric, dietary and laboratory measures of CM risk were assessed including: percentage body fat (%BF measured via bioelectrical impedance Tanita™), blood pressure (BP), 3-day validated food diary and fasting capillary whole blood glucose and lipid profile. Traditional (BMI, WC, WHpR) and novel (CUN-BAE, ABSI and WHtR) proxy indicators of adiposity were assessed or calculated using standardised techniques[(2–4)]. The strength of the association of these measures with CM risk indices were then compared based on the strength of the Pearson correlation coefficient in males (M) and females (F) (Table 1).

Table 1. Pearson correlation coefficient of the association between cardiometabolic risk indices and proxy indicators of adiposity (*p < 0·05, **p < 0·01).

	BMI kg/m2		WC cm		WHpR %		CUNBAE m11/6 k-2/3		ABSI		WHtR	
	M	F	M	F	M	F	M	F	M	F	M	F
Anthropometry												
%BF	**·25****	**·61****	**·26****	**·68****	0·06	0	**·24****	**·79****	0·15	0·01	**·31****	**·59****
Systolic BP (mmHg)	0·02	0·07	0	**·13***	−0·11	0·07	0·05	0·12	−0·06	0·03	−0·02	0·07
Diastolic BP (mmHg)	0·04	**·20****	0·06	**·22***	0·13	**·20****	0·04	**·22****	0·07	0·05	0·1	**·22****
Dietary												
Average energy intake (kcal/d)	−0·05	0	−0·1	0·04	−0·01	−0·06	−0·03	−0·09	−0·04	0·13	−0·08	0·05
Energy from fat (%)	−0·09	0·11	0·06	**·18****	0	0·03	−0·1	0·12	·15*	0·1	0·02	**·16****
Energy from saturated fat (%)	−0·11	0·1	0·02	**·16***	−0·01	0·02	−0·13	0·11	0·12	0·1	−0·01	**·15****
Energy from sugar (%)	−0·01	−0·1	−0·1	−0·1	0·04	−0·08	−0·01	−0·07	−0·09	−0·05	−0·05	−0·09
Laboratory												
Blood Cholesterol (mmol/L)	0·15	0·05	0·11	0·1	−0·01	0	**·16***	0·1	0·02	0·06	**·16***	0·09
Blood TG (mmol/L)	0·02	0·6	0·08	0·06	0·07	−0·01	0·03	0·08	0·09	−0·01	0·08	0·06
Blood LDL (mmol/L)	0·14	0·1	0·03	0·14	−0·01	−0·11	0·15	**·23****	−0·08	−0·04	0·08	0·09
Blood Glucose (mmol/L)	−0·04	**·15***	0·11	**·19****	**·16***	**·33****	−0·05	0·12	**·17***	0·12	0·09	**·19****

For men, most novel and traditional proxy measures showed weak associations with measured %BF. While there were occasional correlations with other dietary and laboratory correlates of CM risk, both CUN-BAE and WHtR showed weak but significant association with %BF and whole blood total cholesterol. For women, CUN-BAE correlated the strongest with %BF, while WC and WHtR demonstrated weak but (very) significant associations with various anthropometric, dietary and laboratory indices of CM risk. The findings suggest that for young adults in general, ABSI and WHpR show no or limited potential as proxy indicators of adiposity. Furthermore, the findings propose that gender specific proxy indicators may be required and, specifically for women, use of WC, WHtR and CUN-BAE may be more appropriate than BMI. This might be due to differences in adipose tissue type and distribution.

1. Haslam D, James WPT (2005) *The Lancet* **366**, 1197–1209
2. Ashwell M, Gunn P, Gibson S (2012) *Obesity Reviews* **13**, 275–286
3. Fuster-Parra P, Bennasar-Veny M, Tauler P *et al.* (2015) *PLoS ONE* **10**, e0122291
4. Krakauer NY and Krakauer JC (2012) *PLoS ONE* **7**, e39504