Value of BMI-SDS, waist circumference-SDS and waist-to-height ratio in the identification of obese children and adolescents at an increased risk for cardio-metabolic complications

J. Kovač[1], Petra Pavlič[3], Brigita Perdih[3], Primož Kotnik[2,3]
[1]*Unit of Special Laboratory Diagnostics, University Children's Hospital, University Medical Centre Ljubljana, Ljubljana, Slovenia*
[2]*Department of Pediatric Endocrinology, Diabetes and Metabolic Diseases, , University Children's Hospital, University Medical Centre Ljubljana, Ljubljana, Slovenia*
[3]*Faculty of Medicine, University of Ljubljana, Ljubljana, Slovenia*
Correspondence: assist. prof. Primož Kotnik; primoz.kotnik@mf.uni-lj.si

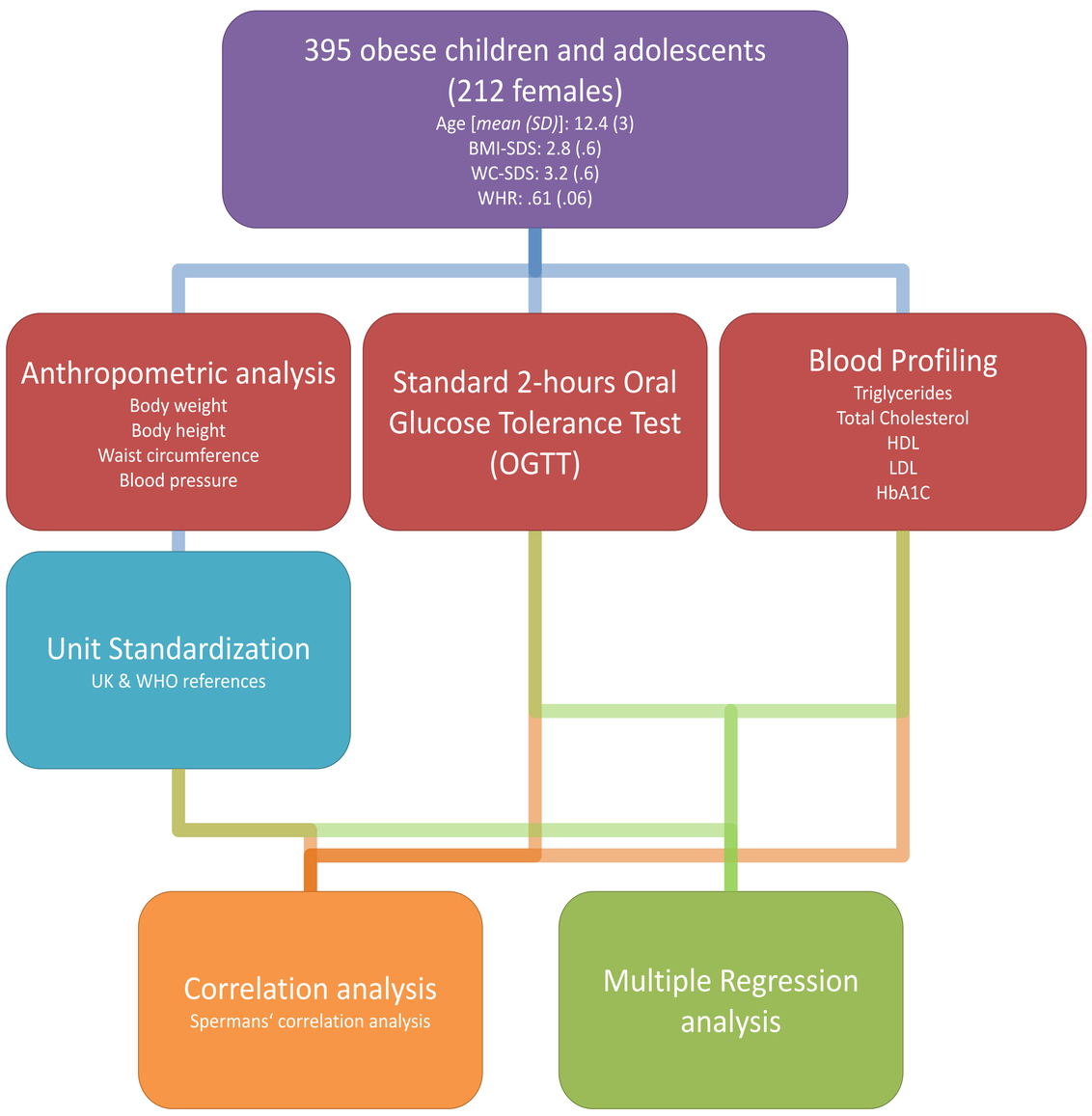
univerzitetni klinični center ljubljana
University Medical Centre Ljubljana

Identification of obese children/adolescents at an increased risk of cardio-metabolic complications is of paramount significance for early clinical intervention.

AIM

To determine **the value of simple anthropometric measures of obesity** (BMI-SDS, waist circumference [WC-SDS], waist-to-height ratio [WHR]) **in the identification of individuals at an increased risk for selected cardio-metabolic complications** (impaired glucose metabolism, dyslipidemia, increased blood pressure).

METHODS



RESULTS

Correlations between BMI-SDS, WC-SDS, WHR and selected cardio-metabolic complications are presented in table 1. Correlations were not determined for total cholesterol, LDL and A1c.

Table 1

	HOMA-IR	Matsuda	HDL	Tg	SP-SDS	DP-SDS
BMI-SDS	.18*	-.10	-.23*	.27*	.28*	.15*
WC-SDS	.07	-.02	-.19*	.23*	.21*	.16*
WH ratio	.28*	-.25*	-.20*	.35*	.17*	.20*

BMI-body mass index, WC-waist circumference, WH-waist height, SDS-standard deviation score, HOMA-IR-homeostatic model assesment of insulin resistance, HDL—high density lypoprotein, Tg-triglycerides, SP-systolic pressure, DP-diastolic pressure. *P<0.001

Using regression analysis we determined that **analyzed anthropometric measures of obesity alone describe only a small proportion in the variability** of HOMA-IR (19.5%), HDL (4.5%) , Tg (11%), SP (10%), DP (4%). **WHR had the highest impact in regression analysis models** except for HDL (BMI-SDS).

Building a model (HOMA-IR)

Figure 1

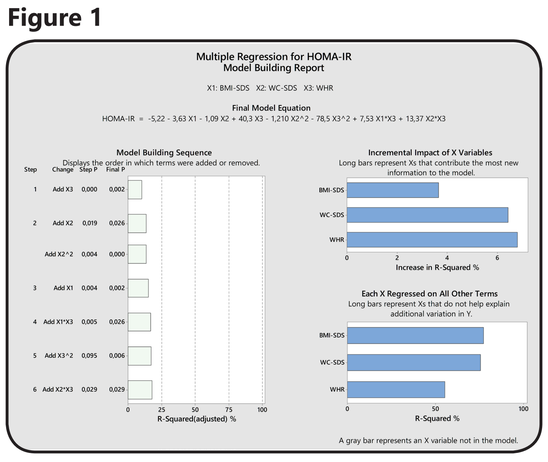
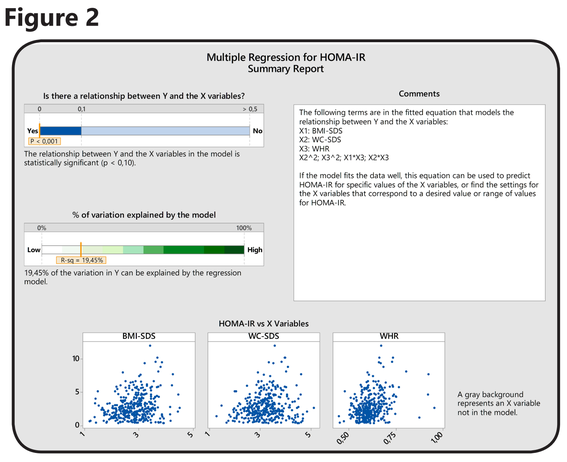


Figure 2



The largest contribution to HOMA-IR model had WHR variable (figure 1). Final model equation (figure 3) describing relation between BMI-SDS, WC-SDS, WHR and HOMA-IR captures approximately 20% of population variability (figure 2).

Figure 3

$$y = -5.22 - 3.63x_1 - 1.09x_2 + 40.3x_3 - 1.21x_2^2 - 78.5x_3^2 + 7.53(x_1 \times x_3) + 13.37(x_2 \times x_3)$$

Final equation of HOMA-IR relation to BMI-SDS, WC-SDS and WHR. *(x_1 - BMI-SDS, x_2 - WC-SDS, x_3 - WHR, y - HOMA-IR)*

CONCLUSIONS

Simple anthropometric measures of obesity (BMI-SDS, WC-SDS, WHR) were **correlated to selected cardio-metabolic complications** (insulin resistance, dyslipidemia and hypertension) in obese children and adolescents.

These measures however seem **to have only a limited value in the prediction models for the selected cardio-metabolic complications**, WHR having the highest impact.

REFERENCES

1. Weiss R, Bremer AA, Lustig RH. **What is metabolic syndrome, and why are children getting it?** Ann N Y Acad Sci. 2013 Apr;1281:123-40.

2. Cole TJ, Freeman JV & Preece MA. **Body mass index reference curves for the UK, 1990.** Archives of Disease in Childhood 1995 73 25–29.

3. Gungor N, Saad R, Janosky J & Arslanian S. **Validation of surrogate estimates of insulin sensitivity and insulin secretion in children and adolescents.** J Pediatr2004 14447–55.

4. Yeckel CW, Weiss R, Dziura J, Taksali SE, Dufour S, Burgert TS, Tamborlane WV & Caprio S. **Validation of insulin sensitivity indices from oral glucose tolerance test parameters in obese children and adolescents.** J Clin Endocrinol Metab 2004 891096–1101.

55ESPE 534--P2
Fat metabolism and Obesity
Primoz Kotnik
DOI: 10.3252/pso.eu.55ESPE.2016
Poster presented at: ESPE 2016 PARIS 10-12 SEPTEMBER