

INDEXES OF ADIPOSITY AND BODY COMPOSITION IN THE PREDICTION OF METABOLIC SYNDROME IN OBESE CHILDREN AND ADOLESCENTS: WHICH IS THE BEST?

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Objective

There is no agreement about which index of adiposity and/or body composition is the most accurate in identifying the metabolic syndrome (METS). The aim of our study was to compare the accuracy of the different indexes in order to recognize the most reliable.

Study Design

We evaluated 1332 obese children and adolescents (778 females and 554 males), aged 14.4 ± 1.8 yrs., Body Mass Index (BMI) standard deviation scores (SDS) 2.99 ± 0.55 , followed at the Istituto Auxologico Italiano, a tertiary center for childhood obesity. For each subject the following indexes were assessed: BMI, BMI SDS, Fat-Free Mass Index (FFMI), Fat Mass Index (FMI), Tri-Ponderal Mass Index (TMI), Waist-to-Height ratio (WtHR) and a new one, the Body Mass Fat Index (BMFI), which normalizes the BMI for percentage of body fat and the waist circumference. Thereafter we calculated for each index a threshold value for age and sex, in order to compare their accuracy, sensitivity and specificity in identifying the METS.

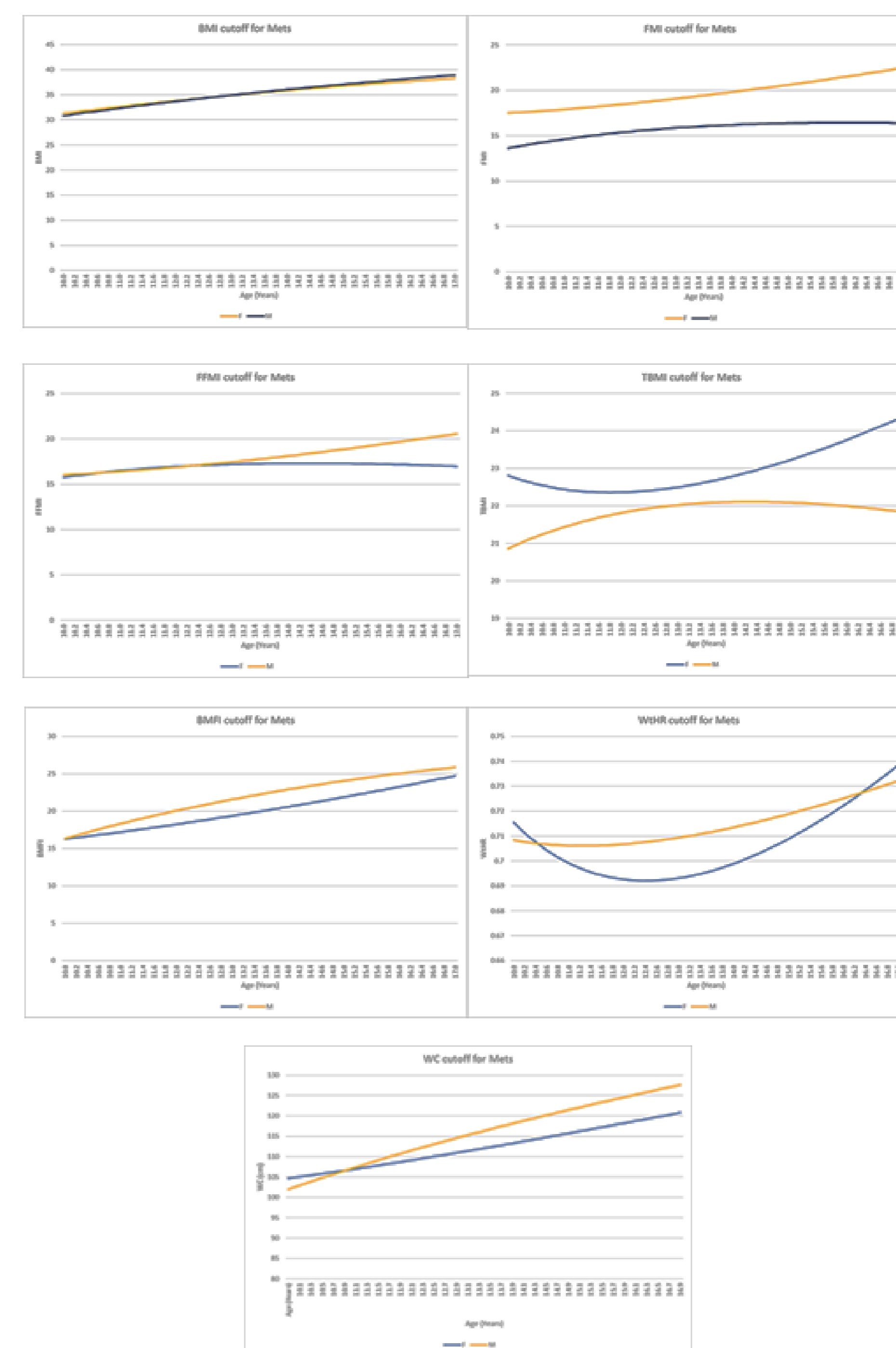
	females	males	all
Number of subjects	778	554	1332
Age yrs	14.5 ± 1.8	$14.2 \pm 1.9^*$	14.4 ± 1.8
BMI	37.2 ± 5.7	37.5 ± 5.9	37.3 ± 5.8
BMI SDS	2.96 ± 0.50	3.02 ± 0.61	2.99 ± 0.55
TMI	23.3 ± 3.6	$22.6 \pm 3.4^*$	23.0 ± 3.5
BMFI	22.6 ± 8.1	22.9 ± 8.6	22.7 ± 8.3
FMI	20.1 ± 4.9	$19.2 \pm 5.0^*$	19.7 ± 4.9
WtHR	0.69 ± 0.08	$0.70 \pm 0.07^*$	0.69 ± 0.08
FFMI	17.1 ± 1.9	$18.3 \pm 2.3\&$	17.6 ± 2.2
WC (cm)	109.9 ± 13.7	$116.9 \pm 13.9\&$	112.8 ± 14.2
SBP (mm/Hg)	122.7 ± 11.4	$127.0 \pm 12.7\&$	124.5 ± 12.1
DBP (mm/Hg)	77.2 ± 7.5	$78.3 \pm 8.1^*$	77.7 ± 7.8
HDL-C (mg/dl)	45.7 ± 10.6	$42.4 \pm 11.2\&$	44.3 ± 11.0
TG (mg/dl)	93.5 ± 42.1	$100.9 \pm 43.1^*$	96.6 ± 42.6
glycemia (mmol/L)	4.3 ± 0.4	$4.4 \pm 0.4^*$	4.4 ± 0.4

Results

There was a good correlation among indexes ($p < 0.0001$ for all). However, when the area under the curve (AUC) was compared, some of them, in particular the BMFI and the BMI, performed better than the other ones, although the differences were small.

Females							
	BMFI	BMI	TMI	FMI	FFMI	WtHR	BMI SDS
AUC	0.69	0.68	0.66	0.67	0.61	0.68	0.68
BMFI	-	0.50	0.03	0.001	0.006	0.35	0.36
BMI		-	0.002	0.08	0.001	0.67	0.32
TPMI			-	0.55	0.03	0.42	0.01
FMI				-	0.05	0.71	0.15
FFMI					-	0.01	0.001
WtHR						-	0.77

Males							
	BMFI	BMI	TMI	FMI	FFMI	WtHR	BMI SDS
AUC	0.59	0.58	0.55	0.58	0.55	0.56	0.58
BMFI	-	0.54	0.01	0.049	0.31	0.03	0.74
BMI		-	0.001	0.73	0.30	0.16	0.42
TPMI			-	0.05	0.97	0.78	0.001
FMI				-	0.49	0.22	0.56
FFMI					-	0.92	0.26
WtHR						-	0.12



Conclusions

BMI, which neither considers body composition nor fat distribution, performs as good as other indexes, and should therefore be the preferred one, also because of the easiness of its calculation