

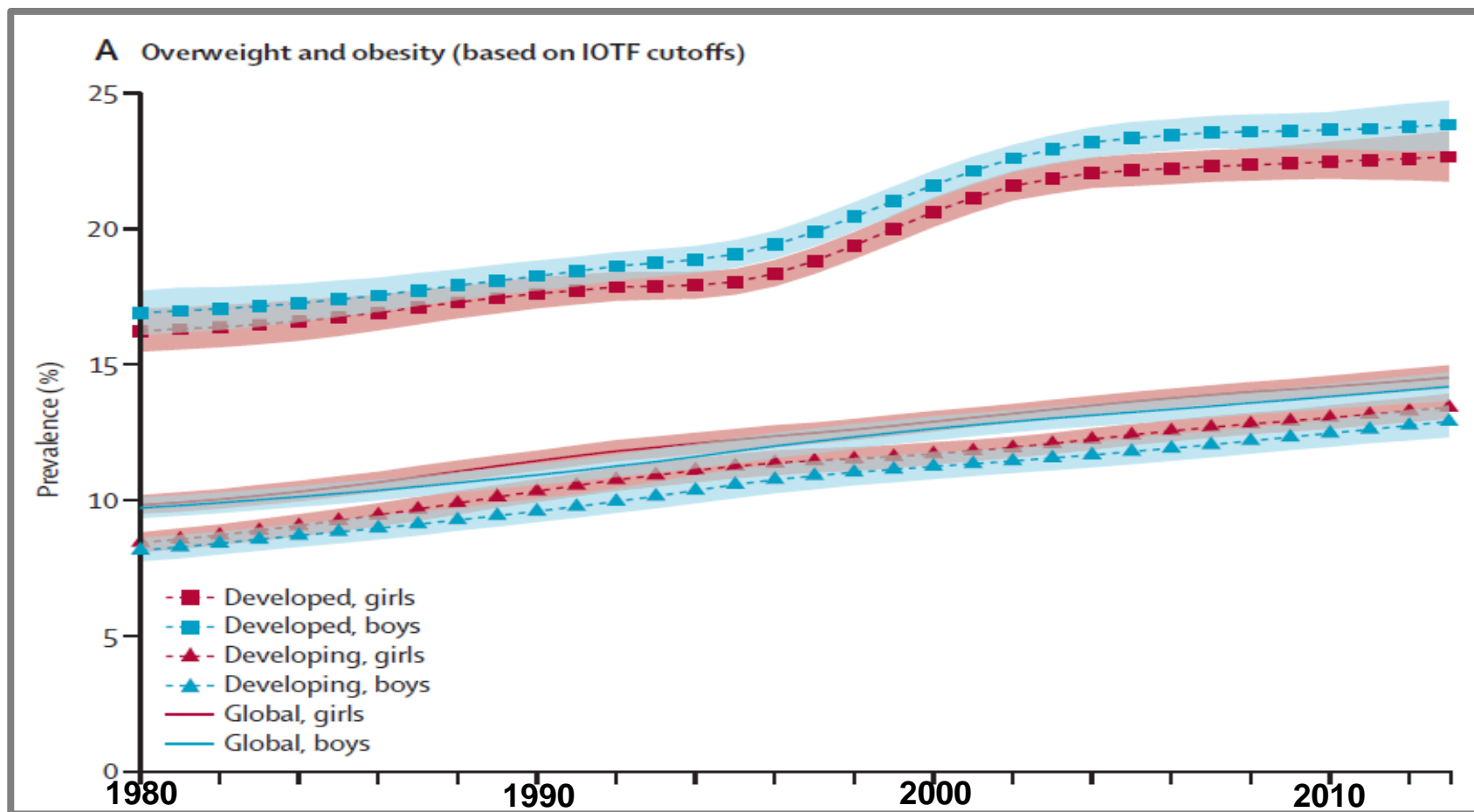
CHILDHOOD OBESITY: DOES IT HAVE ANY EFFECT ON YOUNG ARTERIES?

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PREVALENCE OF OVERWEIGHT AND OBESITY, AGE: 2-19, 1980-2013

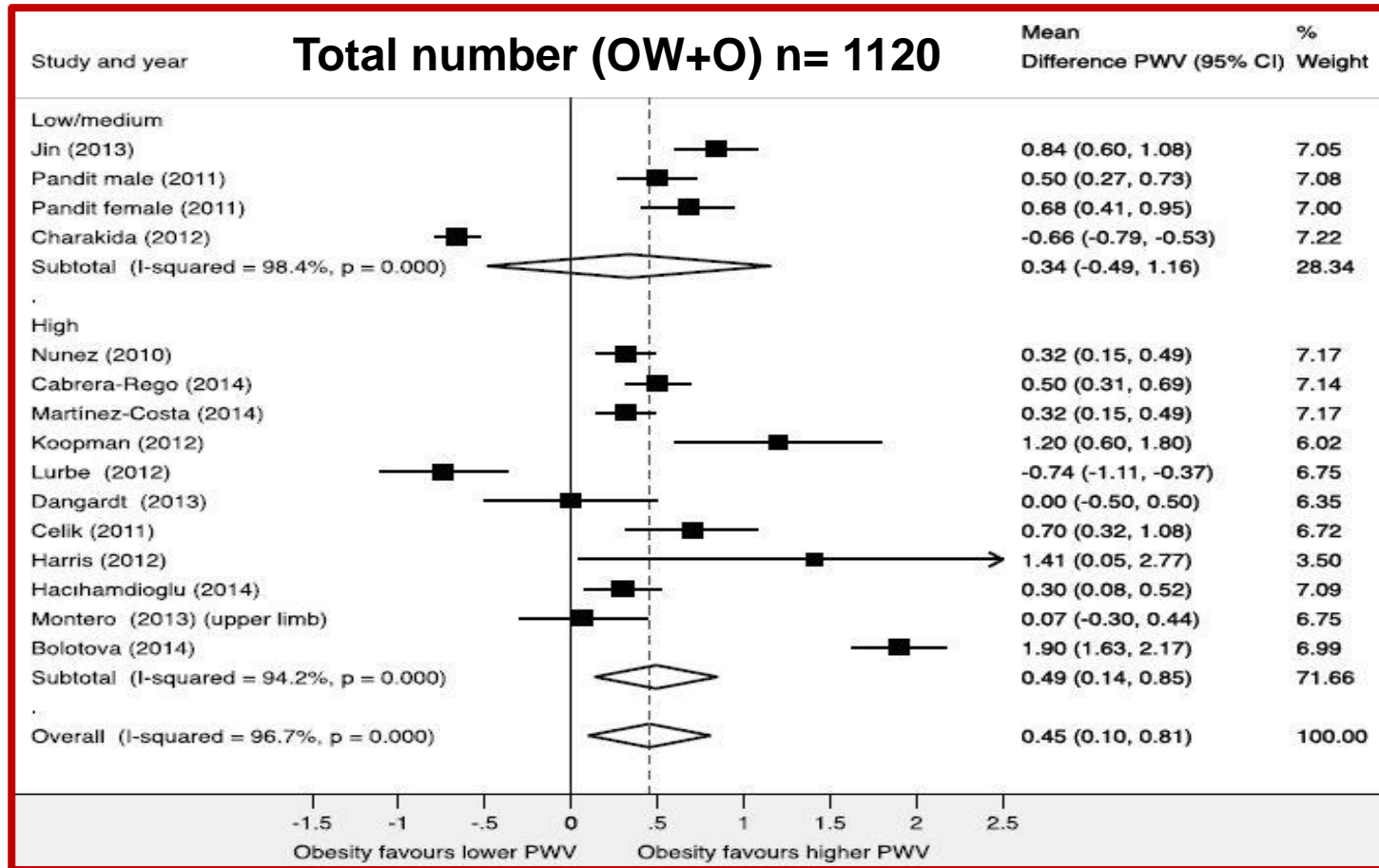


Ng et al. *Lancet*. 2014; 384:766-81.

OBESITY AND CARDIOVASCULAR MORBIDITY AND MORTALITY

- **Obesity is associated with significantly decreased life expectancy**
(Peeters A *et al. Ann Intern Med.* 2003; 138:24–32.)
- **Most cardiovascular (CV) deaths are attributed to overweight and obesity**
(Lim SS *et al. Lancet.* 2012; 380:2224–60.)
- **Obese children are prone to develop early CV morbidity and are at increased risk for CV mortality in their adult life**
(Reilly JJ *et al. Int J Obes.* 2011; 35:891–898.)

CHILDHOOD OBESITY AND ARTERIAL STIFFNESS



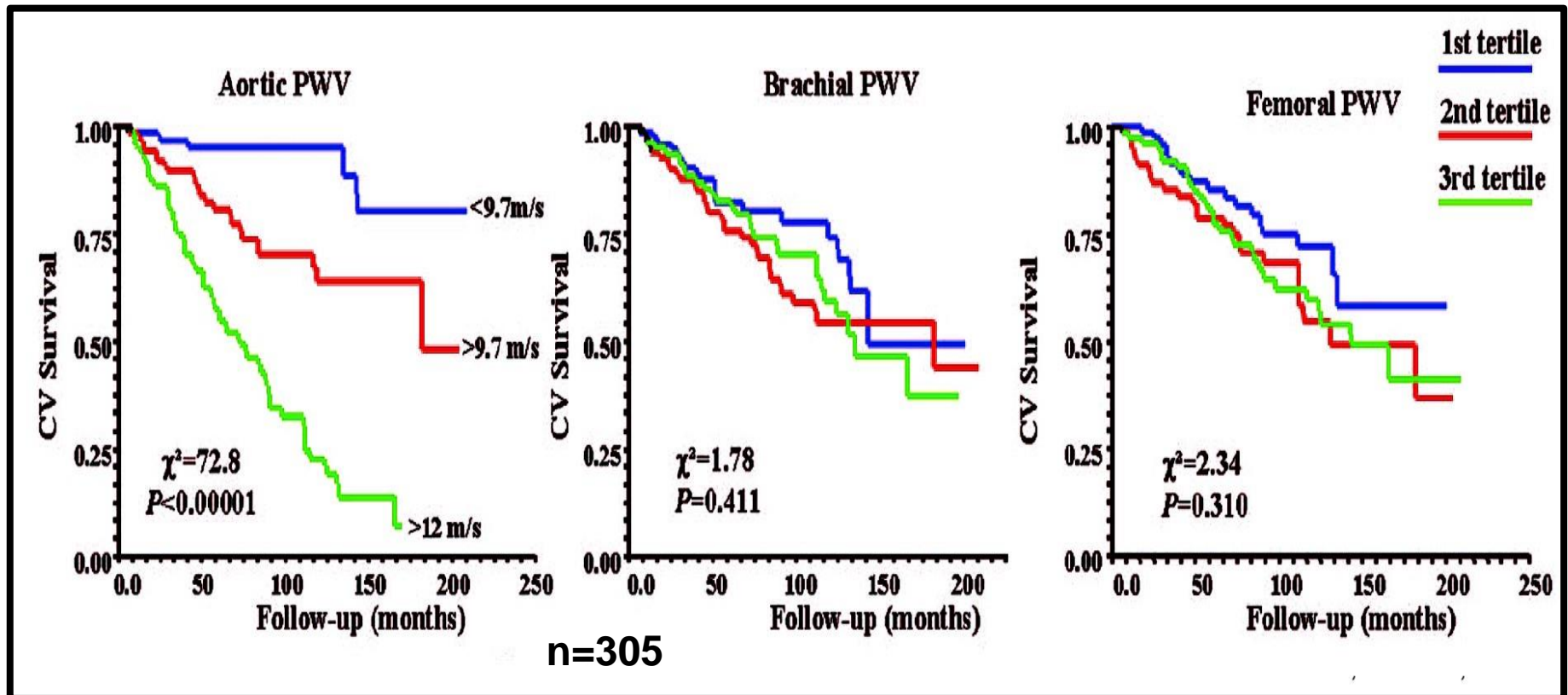
CRITERIA FOR ARTERIAL STIFFNESS MEASUREMENTS IN OW/O CHILDREN AND ADOLESCENTS

- Aortic (PWV_{ao})/carotid-femoral ($_{cf}PWV$) pulse wave velocity should be measured

(Pannier *et al.*, *Hypertension*. 2005; 45:592-596.

Vlachopoulos *et al.*, *J Am Coll Cardiol*. 2010; 55:1318–27.)

PREDICTIVE VALUE OF PWV_s MEASURED IN AORTA AND MUSCULAR TYPE ARTERIES

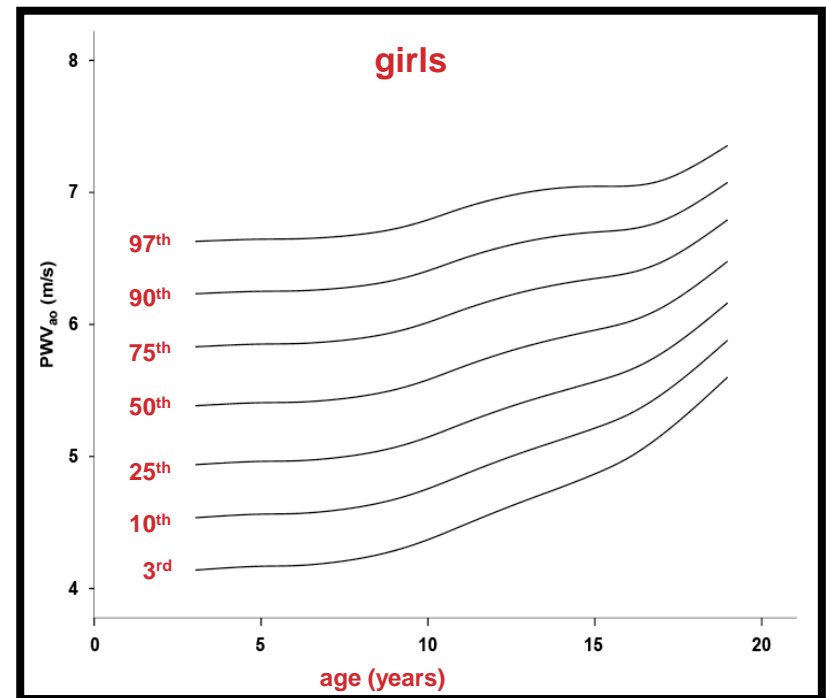


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(Pannier *et al.*, *Hypertension*. 2005; 45:592-596.
Vlachopoulos *et al.*, *J Am Coll Cardiol*. 2010; 55:1318–27.)
- **Age of OW/O patients and controls must be identical**
(Reusz *et al.*, *Hypertension*. 2010; 56:217–224.
Hidvégi *et al.*, *J Hypertens*. 2012; 30:2314–21.)

AGE RELATED REFERENCE VALUES OF PWV_{ao} FOR BOYS AND GIRLS



Hidvégi *et al.*, *J Hypertens.* 2012; 30:2314–21.

CRITERIA FOR ARTERIAL STIFFNESS MEASUREMENTS IN OW/O CHILDREN AND ADOLESCENTS

- **Aortic (PWV_{ao}), or carotid-femoral (PWV_{cf}) pulse wave velocity should be measured**
(Pannier *et al.*, *Hypertension*. 2005; 45:592-596.
Vlachopoulos *et al.*, *J Am Coll Cardiol*. 2010; 55:1318–27.)
- **Age of OW/O patients and controls must be identical**
(Reusz *et al.*, *Hypertension*. 2010; 56:217–224.
Hidvégi *et al.*, *J Hypertens*. 2012; 30:2314–21.)
- **Brachial systolic blood pressure (SBP_{brach}) should be the same in patients and controls**
(Qi *et al.*, *J Pediatr Endocrinol Metab*. 2016; 29:113–25.
Urbina *et al.*, *Hypertension*. 2009; 54:919–950.)

Evaluating literature we found NO PAPER fulfilling these rigorous criteria.

AIM

To compare the arterial function parameters

- aortic pulse wave velocity (PWV_{ao})**
- aortic augmentation index (Aix_{ao})**
- aortic systolic blood pressure (SBP_{ao})**

AND brachial systolic blood pressure (SBP_{brach})

measured simultaneously in OW/O patients and healthy subjects in a large population aged between 3-18 years,

strictly applying the previously discussed criteria

PATIENTS AND METHODS

- **6.816 Caucasian subjects (3.668 boys) aged 3–18 years, in Szolnok town (Hungary), 2012-2016.**
- **Subjects were categorised by their body mass index (BMI) into N, OW and O groups regarding their age and sex as well (Cole *et al. Pediatr Obes.* 2012; 7:284–294.)**
- **AFPs were measured by an invasively validated device (Arteriograph, TensioMed Ltd, Budapest, Hungary) (Horváth *et al. J Hypertens* 2010; 28:2068–75.)**

ARTERIOGRAPH MEASUREMENT IN KINDERGARTEN



Small size, portable

Automatic measurement

User-independent

Fast, cc. 2 minutes

Painless

Informed consents from parents were given to show this picture on congress „Artery2018”

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- **AFPs were measured by an invasively validated device (Arteriograph, TensioMed Ltd, Budapest, Hungary) (Horváth *et al. J Hypertens* 2010; 28:2068–75.)**
- **Propensity score matching was carried out using the “Nearest Neighbour” method with the grouping variable weight (BMI category of N, OW and O) and SBP_{brach}, HR, age and sex as variables (SPSS 23.0.0.0 statistical package, SPSS Inc., Chicago, Illinois, USA)**

RESULTS – BASIC CHARACTERISTICS

				Kruskal-Wallis test		
	N	OW	O	N-OW	OW-O	N-O
number of patients (n, %)	5.460	911	445			
	80.1	13.4	6.5			

N, normal weight; OW, overweight; O, obese; SBP_{brach}, brachial systolic blood pressure;

RESULTS – CHARACTERISTICS OF THE PROPENSITY SCORE MATCHED GROUPS AND CLARIFIED AFPs

	OW			O		
	controls	patients	Welch t-test	controls	patients	Welch t-test
number of patients (n)	911	911	-	445	445	-

*, parameters were significantly different between OW and O group, $p < 0.001$

DISCUSSION

	Normal	Overweight	Obese
Double Product (HRxSBP _{brach})	9.357	9.998	10.824

CONCLUSIONS

- Overweight/obesity in children and adolescents WERE NOT ASSOCIATED with increased aortic stiffness (PWV_{ao})
- OW/O MIGHT NOT HAVE DIRECT ADVERSE EFFECT on the aortic wall in this age range
- The effects of childhood overweight/obesity on circulation ARE COMPENSATED by decreased peripheral vascular resistance (i.e. decreased Aix_{ao})
- Overweight/obese children and adolescents ARE AT INCREASED RISK for CV morbidity (chronic sympathetic overdrive)
- We plan to follow-up these OW/O patients in order to detect WHEN aortic wall damage - as stiffening - occurs



Thank you for your attention!
Mayfly sculpture, Szolnok, Hungary