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Association of Pulse Wave Velocity and Body Mass Index in a Healthy Mexican Population

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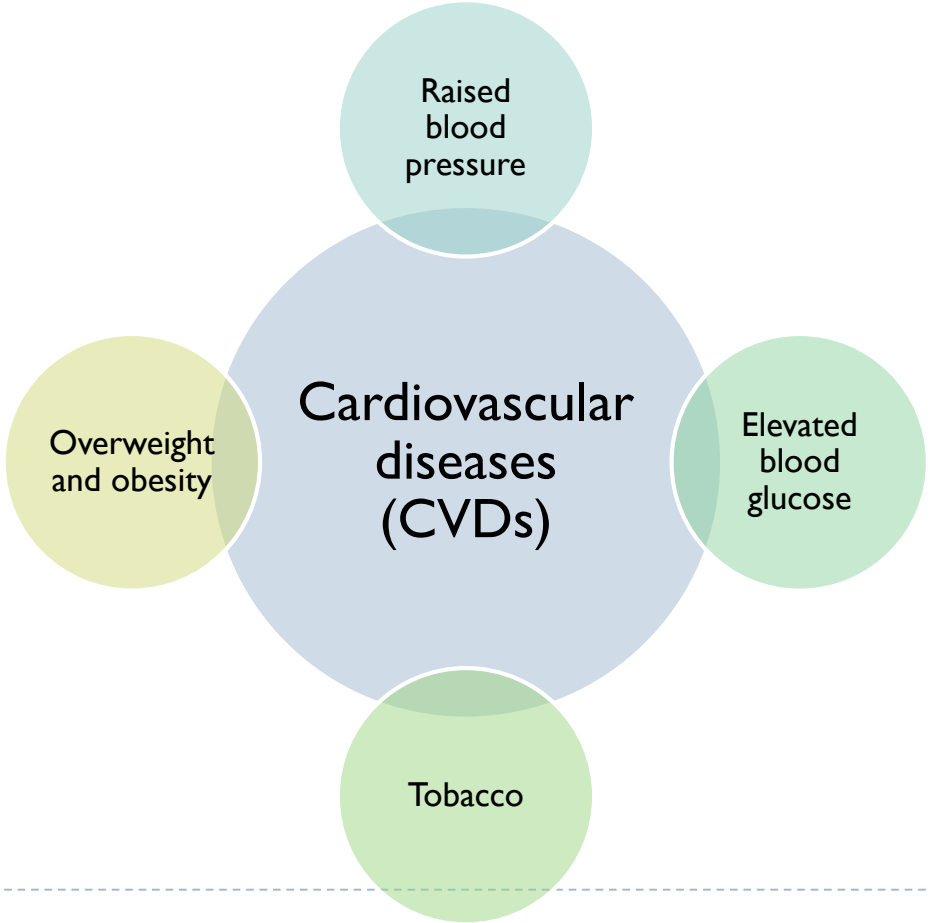
Rational

#1cause of death in the whole world



Take the lives of 17.9 million people every year 31%

WHO 2017

- **In 2016**
  - **More than 1.9 billion adults were overweight (39%).**
    - **650 million were obese (13%).**
- **Mexico**
  - Represents the second place in obesity, with a prevalence of 32.4%
  - **In 2030** 39% of the population are projected to be obese.

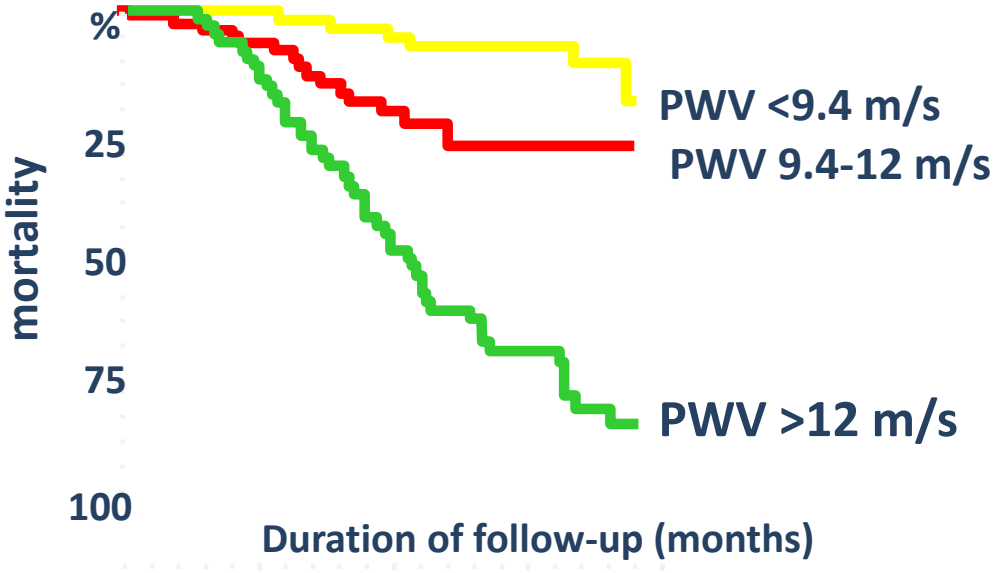
OMS 2017/ OECD 2017

Markers of hypertension-mediated organ damage

	Marker of HMOD	Sensitivity to changes	Reproducibility and operator independence	Time to changes	Prognostic value of the change
I B	LVH by ECG	Low	High	Moderate (>6 months)	Yes
IIb B	LVH by echocardiogram	Moderate	Moderate	Moderate (>6 months)	Yes
	LVH by CMR	High	High	Moderate (>6 months)	No data
I B	eGFR	Moderate	High	Very slow (years)	Yes
I B	Urinary protein excretion	High	Moderate	Fast (weeks to months)	Moderate
IIb B	Carotid IMT	Very low	Low	Slow (>12 months)	No
IIb B	PWV	High	Low	Fast (weeks to months)	Limited data
IIb B	Ankle-brachial index	Low	Moderate	Slow (>12 months)	Moderate

CMR = cardiac magnetic resonance; ECG = electrocardiogram; eGFR = estimated glomerular filtration rate; HMOD = hypertension-mediated organ damage; IMT = intimamedia thickness; LVH = left ventricular hypertrophy; PWV = pulse wave velocity.

PWV and Mortality

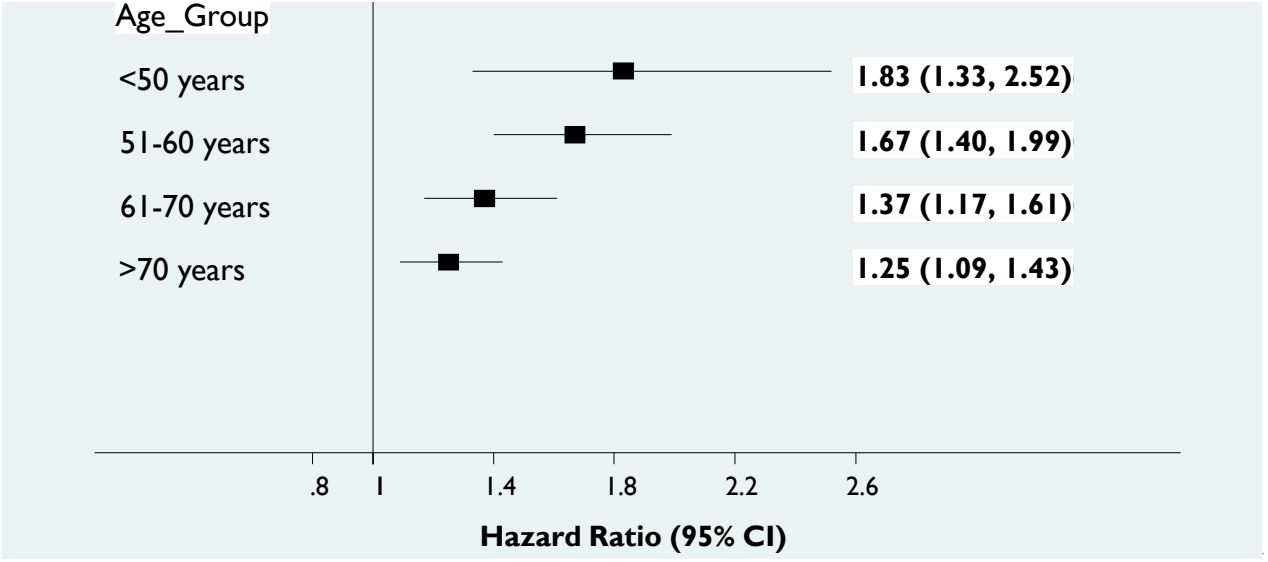


Population					
PWV <9.4 m/s	81	81	78	77	75
PWV 9.4-12.0 m/s	80	75	67	64	64
PWV >12.0 m/s	80	69	46	35	29

Blacher J. Circulation 1999. 99:2434-39

14 studies including 16,358 patients with 1700 combined CVD events.

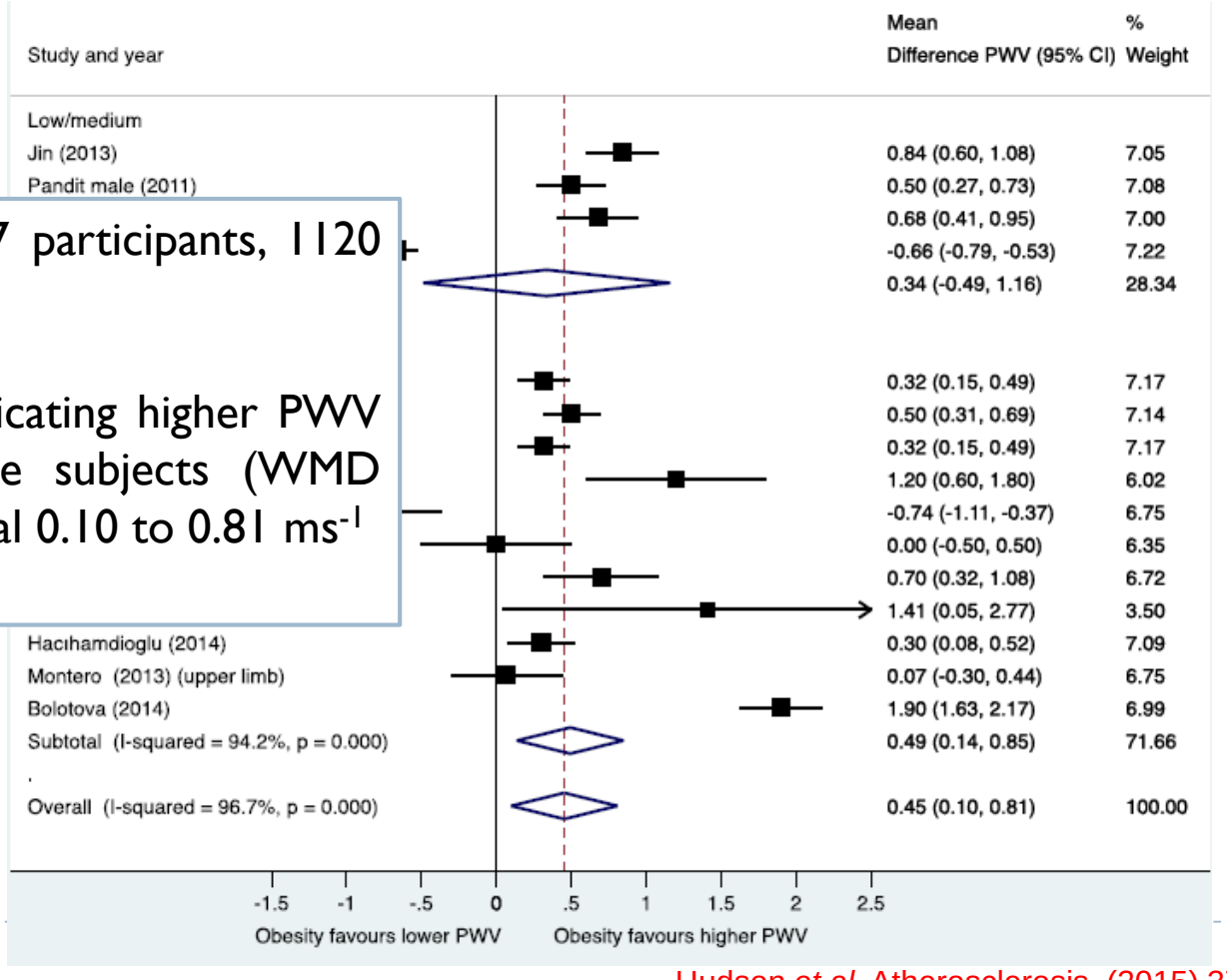
z-scores of log transformed cf-PWV (pooled SD = 3.3m/s).



Schlomo *et al.* ARTERY 11, Oct 2011

14 studies inclunding 6677 participants, 1120 obese and 5557 non-obese.

A difference was found indicating higher PWV in obese versus non-obese subjects (WMD 0.45 (95% confidence interval 0.10 to 0.81 ms^{-1}



Hudson *et al.* Atherosclerosis (2015) 376-386

Objective

Analyze the correlation between baPWV and BMI in healthy subjects.

Methodology

- Cross-sectional analytical study
- 381 Subjects
- W=192 M=189
- 18-70 year old

- Characteristics of the population

	Mean	Min	Max
baPWV (m/s)	11.21	6.42	19.69
BMI	26.44	18.5	42.57
Waist (cm)	88.94	62	134
Age	30.13	18	70
SBP (mmHg)	115.12	90	129
DBP (mmHg)	66.6|	50	89

- Measurements: weight, height, BMI and baPWV with VP1000 plus model BP-203RPE II

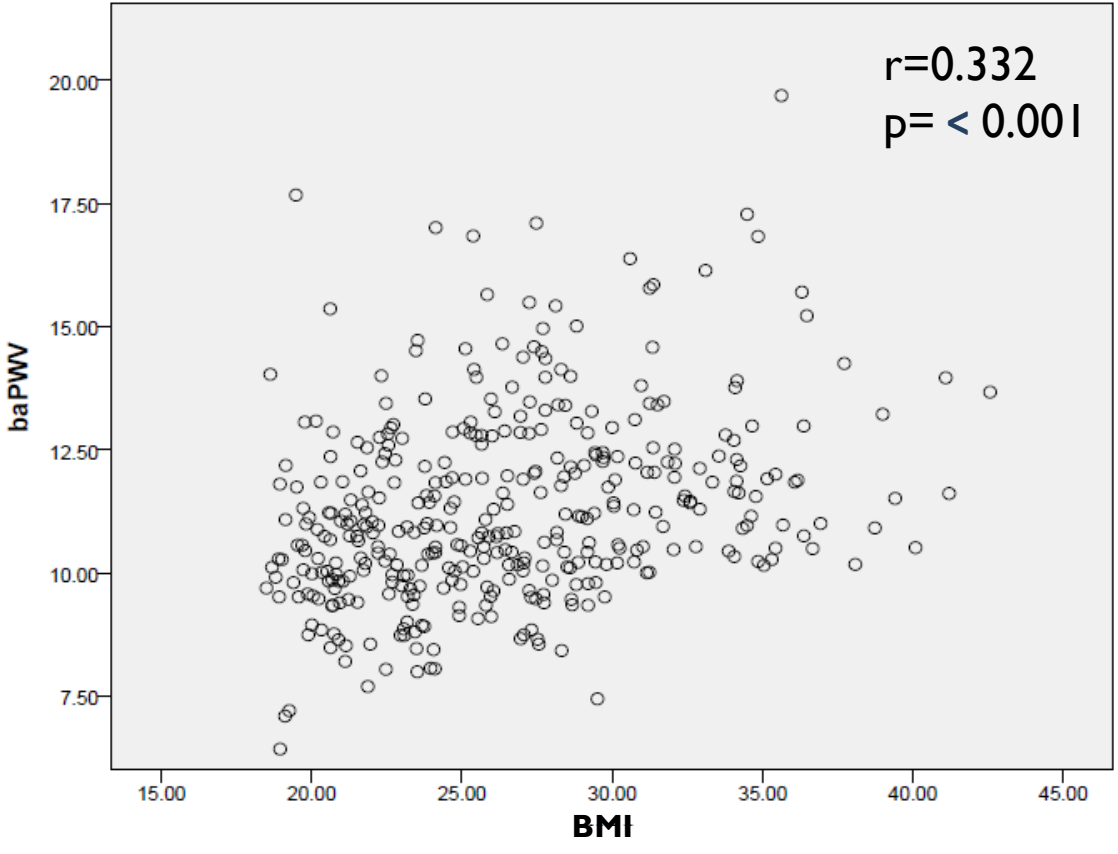
Results

baPWV values according to BMI

N:381	Normal weight	Overweight	Class I obesity	Class II obesity	Class III obesity	p*
n:	167	127	63	20	4	
BMI kg/m^2	21.93 ±1.75	27.37 ±1.37	32.31 ±1.56	36.60 ±1.32	41.24 ±1.01	<0.001
$_{ba}$PWV m/s	10.63 ±1.68	11.57 ±1.9	12.21 ±1.73	12.27 ±2.39	12.43 ±1.65	<0.001
Age	24.8 ±10.84	33.83±14.58	35.59 ±12.91	32.30±9.41	38.25 ±12.28	<0.001

* ANOVA

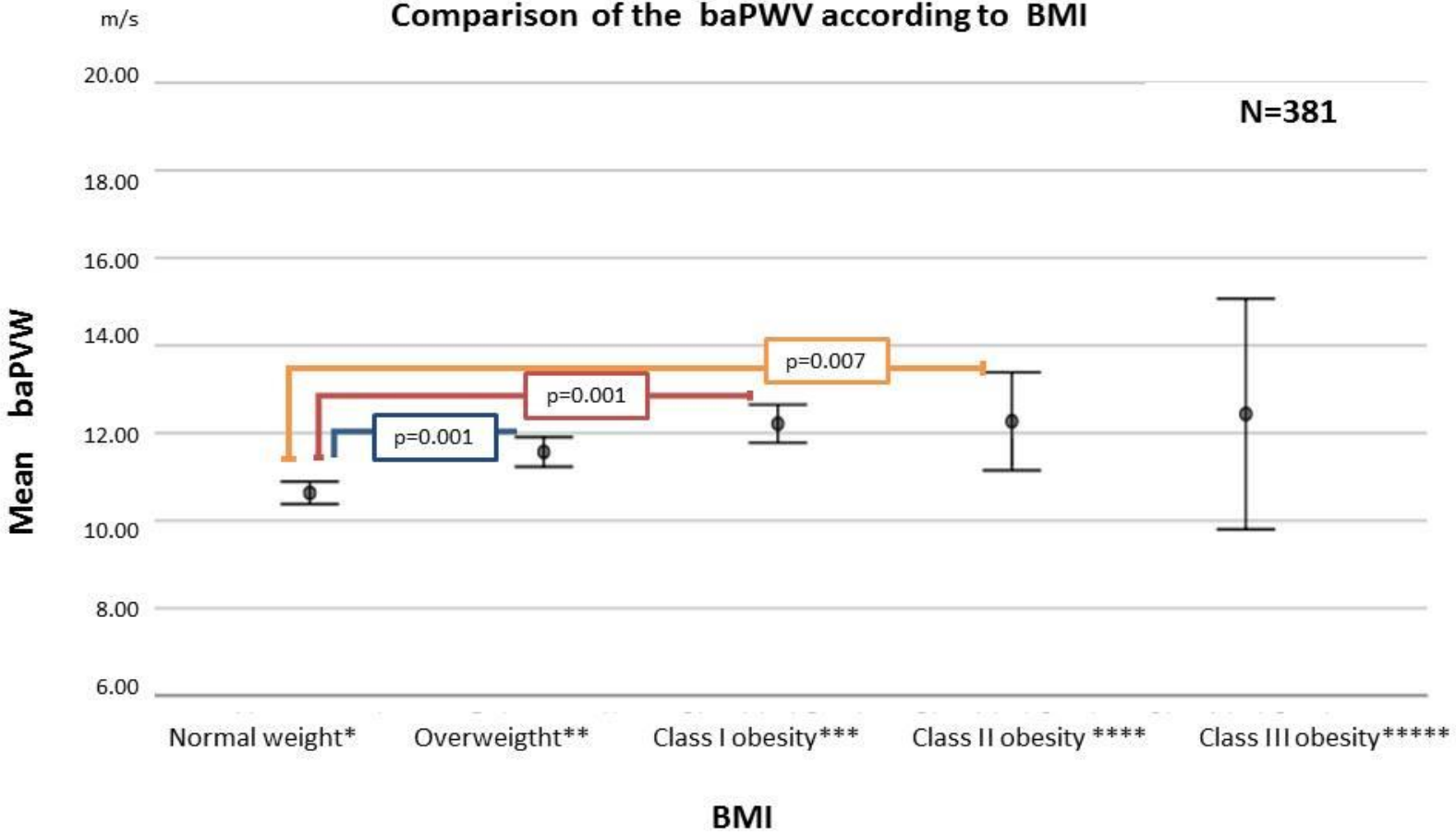
Association between $_{ba}$PWV and BMI



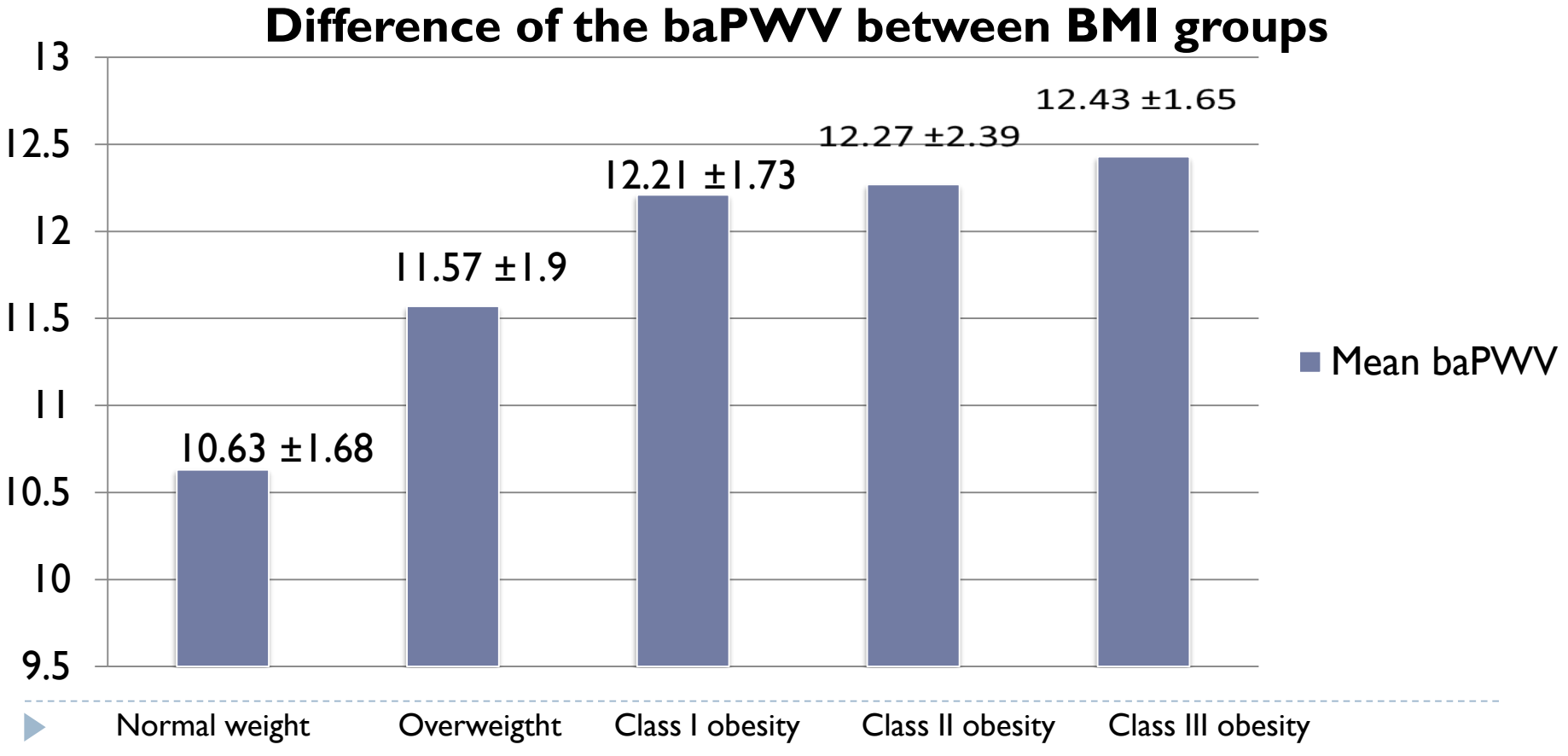
Comparison of the baPWV according to BMI

Groups	Mean(SD)	Mean(SD)	p*
Normal weight vs Overweight	10.63 ±1.68	11.57 ±1.9	<0.001
Normal weight vs Class I Obesity	10.63 ±1.68	12.21 ±1.73	<0.001
Normal weight vs Class II Obesity	10.63 ±1.68	12.27 ±2.39	0.007

* ANOVA



- 18.5-24.9 kg/m² n=167 (10.63 ±1.68); ** 25-29.9 kg/m² n=127 (11.57 ±1.9); *** 30-34.9 kg/m² n=63 (12.21 ±1.73); **** 35-39.9 kg/m² n=20 (12.27 ±2.39); ***** ≥ 40 kg/m² n=4 (12.43 ±1.65).


Difference of the baPWV between BMI groups
13
12.5
12
11.5
11
10.5
10
9.5
10.63 ±1.68
11.57 ±1.9
12.21 ±1.73
12.27 ±2.39
12.43 ±1.65
Mean baPWV
Normal weight
Overweigtht
Class I obesity
Class II obesity
Class III obesity

Conclusions

- There is a direct correlation between baPWV and BMI.
- Special attention should be given to the overweight/Class I obesity groups due to the greater increase of PWV they presented when compared to normal weight subjects.