

OBEITY AND HYPERTENSION GO HAND-IN-HAND: RESULTS FROM A OBSERVATIONAL, CROSS-SECTIONAL STUDY

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Objectives

The main objective of this study was to investigate possible associations between anthropometric measures and the blood pressure (BP) profile in a sample of Portuguese adults.

Material and methods

- Data was collected from a cross-sectional epidemiologic study conducted to estimate the prevalence of hypertension;
- The collected sample was representative by region and stratified by age and gender;
- Anthropometrics were measured by a trained team using standardized methods;
- Three blood pressure measurements were obtained by trained observers using an OMRON M4-1 sphygmomanometer after a 5-min sitting rest;
- Overweight and obesity were classified by the World Health Organization standardized definitions of body mass index (BMI);
- Hypertension was defined as SBP \geq 140 mmHg and/or DBP \geq 90 mmHg.

Results

4992 subjects (55% female) were included with an age range 18-97 years (mean: 46 years) (Table 1). About 68% of the subjects were active workers and 14.4% were retired. Approximately 27% were smokers and 56% never smoked.

Table 1 Subjects characteristics

Gender		BMI (Kg/m ²)	
Male	45.6%	Mean (SD)	25.5 (4.4)
Female	54.4%	< 18.5 (Underweight)	2.8%
		18.5 - 24.9 (Normal weight)	47.3%
Age (years)		25.0 - 29.9 (Overweight)	35.4%
Mean (SD)	45.8 (17.7)	\geq 30 (Obese)	14.5%
Professional activity		Hypertension	43.6%
Active worker	67.9%	JNC Hypertension	
School level		Normal	21.6%
Illiterate	5.8%	Pre-hypertension	39.6%
Up to compulsory	34.7%	Stage 1 hypertension	24.9%
Compulsory or higher level	59.4%	Stage 2 hypertension	13.9%
Smoking Habits			
Non-smoker	56.0%		
Ex-smoker	16.9%		
Smoker	27.1%		

35% of the subjects were overweight and 15% were obese (Figure 1). Prevalence of overweight and obesity was 43% and 14% for male; 29% and 15% for female, respectively. Prevalence of hypertension was 44% at the overall; 49% for male and 39% for female (Figure 2).

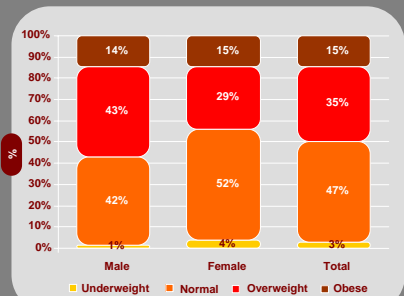


Figure 1 BMI classes by gender and total

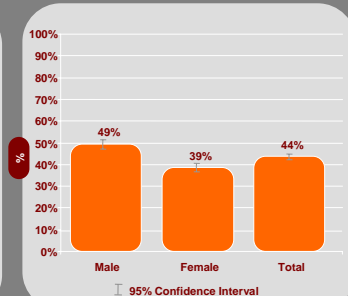


Figure 2 Hypertension by gender and total

Overweight and obesity were associated with a greater tendency for central fat deposition and higher systolic and diastolic BP. For normal, overweight and obese BMI classes the results were, respectively:

- Waist average measurements in male: 85, 97 and 109 cm; $p < 0.001$ (Figure 3);
- Waist average measurements in female: 77, 90, 103 cm; $p < 0.001$;
- Waist average measurements at overall: 80, 94, 106 cm; $p < 0.001$.

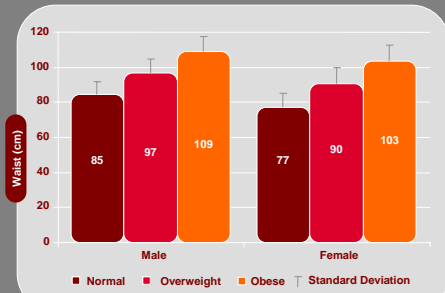


Figure 3 Waist mean by gender and BMI classes

- SBP average measurements in male: 133, 142, 148 mmHg; $p < 0.001$ (Figure 4);
- SBP average measurements in female: 126, 136, 142 mmHg; $p < 0.001$;
- SBP average measurements at overall: 129, 140, 145 mmHg; $p < 0.001$.

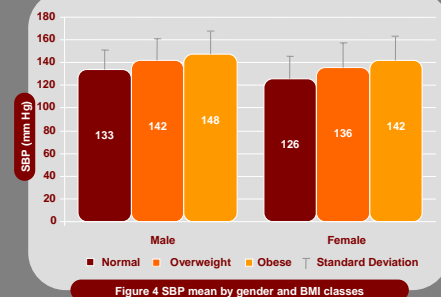


Figure 4 SBP mean by gender and BMI classes

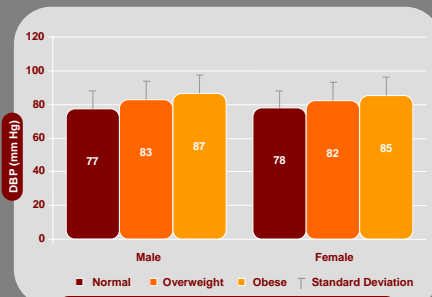


Figure 5 DBP mean values by gender and BMI classes

- DBP average measurements in male: 77, 83, 87 mmHg; $p < 0.001$ (Figure 5);
- DBP average measurements in female: 78, 82, 85 mmHg; $p < 0.001$;
- DBP average measurements at overall: 78, 83, 86 mmHg; $p < 0.001$.

SBP (Figure 6) and DBP (Figure 7) showed statistical correlation with BMI ($p < 0.001$). Although correlation coefficients (r) did not suggest a strong relationship between BMI values and SBP/DBP a tendency can be observed: higher BMI values correspond to higher SBP/DBP values.

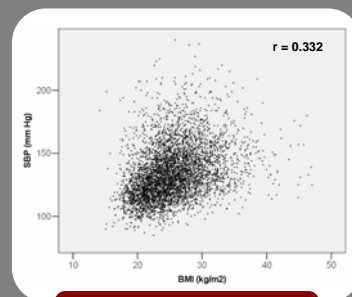


Figure 6 SBP vs. BMI

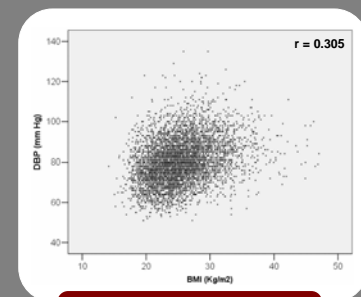


Figure 7 DBP vs. BMI

Hypertension was more common in overweight and obese (53% and 71%) than in normal weight subjects (29%) (Figure 8). In obese, hypertension prevalence was 2.5 times higher than in normal weight.

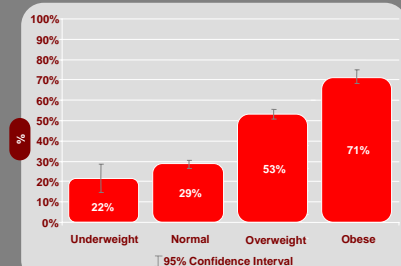


Figure 8 Hypertension by BMI classes

Conclusions

Obesity and hypertension have become an increasing problem in industrialized countries, namely in Portugal. These results show some association between these two burden diseases and the need for more prevention health campaigns.

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