Factors associated with the discrepancy between referred and measured BMI

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Introduction and Aim

The need to understand the determinants of weight gain leading to overweight/obesity has motivated research in the area, in order to prevent and revert this pandemia. Unrealistic perception of body weight and BMI may interfere with the efficacy of public health interventions.

The **aims** of this work were to compare BMI assessed by measured or self-reported weight and height in Portuguese adults and to relate the discrepancies between measured and reported BMI with socio-demographic variables and meaured BMI.

Participants and Methods

Data from the study "Portuguese Population's Food Habits and Lifestyles" were used. A national representative sample of 3529 subjects was interviewed at home between February and April 2009.

Subjects were firstly asked about their current weight and height and subsequently these measurements were taken according to international procedures. Fifty-five subjects refused to be weighted and/or to have their height measured.

BMI was calculated and percentual discrepancies between measured and reported by the subjects [(measured – refered) / (measured x 100]) were analyzed in relation to socio-demographic characteristics and measured BMI categories. BMI categories were used according to WHO (1998). BMI discrepancies are presented as mean (sd). Mean ranks were compared using Mann-Whitney, Wilcoxon and Kruskal-Wallis tests and the association between variables was measured using Spearman's correlation coeficient.

Results and Discussion

Globally, values of measured BMI were significantly higher than refered BMI. However, the associations between refered and measured weight, height and BMI were very strong (r > 0.97 and p>0.001 for all). The discrepancy between them was lower in women compared to men (1.19 vs. 1.47%; Table 1). Table 2 shows the diference between refered and measured BMI by sex.

Significant correlations between the percentual discrepancy between measured and refered BMI and age and education level showed greater underestimation in older (Table 3) and less educated men (Table 4), although being very weak (|r| < 0.1). Table 5 shows the mean BMI discrepancies by region of residence. BMI was significantly associated with its percentual underestimation (r = 0.162 for women and r = 0.238 for men; Table 6).

Future research should explore the reasons underlying the overall underestimation of BMI by subjects and it's relationships with socio-demographic variables, as well as it's influence in the success of interventions and therapies.

Table 1. Mean BMI discrepancies by sex.

TOTAL	Female	Male
1.32 (3.44)	1.47 (3.31)	1.19 (3.55)
	p = 0.001	

Table 2. Diference between refered and measured BMI by sex.

		Mean (sd)	p
Male	Refered IMC	25.9 (3.0)	< 0.001
	Measured IMC	26.3 (3.2)	
Female	Refered IMC	24.2 (4.2)	< 0.001
	Measured IMC	24.6 (4.4)	

Table 3. BMI discrepancies and age.

18-29 years	30-44 years	45-64 years	≥ 65 years
1.14 (2.83)	1.26 (3.34)	1.61 (3.64)	1.22 (3.95)

Correlations between BMI discrepancies and age (years) by sex
Female: r = −0.031 (p = 0.252)
Male: r = 0.071 (p = 0.014)

Table 4. BMI discrepancies and education level.

< 4th grade	4th grade	6th grade	9th grade	12th grade	Bach./univ.
1.26 (4.57)	1.90 (3.91)	1.70 (3.45)	1.31 (3.46)	1.11 (2.84)	0.95 (3.19)

Correlations between BMI discrepancies and education level by sex
Female: r = −0.044 (p = 0.111)
Male: r = −0.087 (p = 0.003)

Table 5. Mean BMI discrepancies by region of residence.

Norte	Centro	LVT	Alentejo	Algarve	Madeira	Açores
1.42 (2.87)	0.64 (3.37)	1.35 (3.44)	2.12 (4.85)	1.70 (4.17)	1.09 (4.56)	2.67 (4.70)
			p < 0.001			

Table 6. BMI discrepancies and measured BMI category.

Underweight (< 18.50)	Normal weight (18.50-24.99)	Pre-obese (25.00-29.99)	Obese (≥ 30.00)
−0.03 (4.16)	0.83 (3.18)	1.51 (3.32)	3.02 (4.18)

Correlations between BMI discrepancies and measured BMI by sex
Female: r = 0.162 (p < 0.001)
Male: r = 0.238 (p < 0.001)

Reference

WHO. Obesity: preventing and managing the global epidemic. Report of a WHO consultation on obesity. Geneva: World Health Organisation; 1998.