

Validity for percentage of fat assessment in adolescents From field methods to laboratory technology

by

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Aim: To examine the validity for percentage body fat (%BF) calculated from anthropometry, electrical bioimpedance (BIA), air-displacement plethysmography (ADP) and dual energy X-ray absorptiometry (DXA) compared to a 4 compartments model.

Methods: A total of 25 (15 male and 10 female) adolescents (independent from the HELENA sample) from Zaragoza within the same age range involved in the HELENA project (12.5-17.5) participated in the study. Anthropometry, BIA, ADP and DXA measures were taken by a trained rater and % BF was calculated from specific equations for each method. Body water was measured by labelled water and then %BF was also calculated by a 4 compartments model (4-CM) proposed by Fuller et al. 1992 [1]. Then systematic and random error between each method and the 4-CM were calculated and statistically tested by Student T-test analysis.

Results: In males, no significant random error was found for any method, being the lowest for DXA (0.3 units) and 3.4, -2 and -1.9 units for anthropometry, BIA and ADP respectively (all $p > 0.05$). In females, significant systematic error was found for all the methods, being the lowest for BIA (10.6 units) and 13.1, 11.5 and 14.6 units for anthropometry, ADP and DXA respectively (all $p < 0.05$)

Conclusion: Percentage of body fat seems to be validly estimated from anthropometry, BIA, ADP and DXA in male adolescents, but an important systematic error were observed in female adolescents.

References

1. Fuller NJ, Jebb SA, Laskey MA, *et al.* Four-component model for the assessment of body composition in humans: comparison with alternative methods, and evaluation of the density and hydration of fat-free mass. *Clin Sci (Lond)*. 1992;82:687-93

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