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Body composition assessment of young adults in Mauritius: comparison between dual-energy X-ray absorptiometry and isotope dilution technique

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Background & Aims: Both dual-energy X-ray absorptiometry (DXA) and isotope dilution technique with deuterium oxide (D2O) are widely used as reference methods for body composition assessments. There are, however, very few studies that have compared these two reference methods, let alone in non-Caucasian ethnic groups.We compared here the estimates of body composition by DXA and isotope dilution D2O technique in healthy adult Mauritians belonging to the two main ethnic groups on the island, namely Indians (South Asian descent) and Creoles (African/Malagasy descent).

Methods: We studied 90 healthy adult Mauritians (54 women and 36 men, aged 20-43 years) of Indian and Creole descent and with a wide range of BMI (15 –44 kg/m2). Whole body scan was performed by DXA Hologic Horizon® Wi (software version: APEXTM 5.6.0.5) and isotopic enrichment was assessed in saliva by FTIR spectroscopy. The degree and limits of agreement between the estimates of body composition (fat mass and fat-free mass) determined by the two techniques were assessed by the Bland-Altman method.

Results: The mean age and BMI were (27.5 ± 5.3) years and (25•7 ± 5.3) kg/m2, respectively for men, and were (27.4 ± 5.6) years and (23.9 ± 4.9) kg/m2, respectively, for women. Relative to the isotope dilution technique, DXA showed lower values for fat-free mass by about 6% (95% CI: -7.3, -4.7) and higher values for fat mass by about 19% (95% CI: 13.8, 23.9), with the Bland-Altman analysis showing wide limits of agreement. The mean bias, however, was independent of the degree of fatness, and did not differ according to gender or ethnicity.

Conclusions:Our study revealed substantial differences and poor agreement in the estimations of fat-free mass and fat mass by these two widely utilized reference methods. Consequently, these two methods - DXA and isotope dilution technique - cannot be used interchangeably for the estimation of body composition in Mauritian adults.

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