

## **Validation of impedance-based equations for the prediction of body composition as measured by deuterium dilution in North African Arabic children**

**Background/Objectives:** Equations for predicting body composition are population- specific. The aim of this study is to cross-validate prediction equations previously published for the prediction of body composition using the deuterium oxide dilution (D2O) technique.

**Subjects/Methods:** Body composition was estimated by the Tanita impedance analyzer in 134 school children aged between 8 and 11 years. We tested the validity of prediction equations previously published and mainly those made on children aged between 8 and 10 years. Total body water (TBW) and Fat Free Mass (FFM) were determined using the D2O technique.

**Results and discussion:** The cross-validation of equations from the literature in our sample population showed significant correlations in boys and in girls. TBW predicted by Wells et al. and Leman et al. equations was significantly overestimated in girls. However, in boys, Wells equation gave acceptable absolute bias of  $0.36 \pm 1.18$ , ( $p=0.075$ ). The bias was negative and significant in boys for Leman et al. Liu et al. equations significantly underestimate TBW and FFM in males and females. Rush et al. equation showed the higher absolute value for the bias (-5.54 Kg for boys and -5.58 Kg for girls), significant differences displayed by the paired-sample t test ( $<0.001$ ), highest pure error and widest limits of agreement. Previous reports suggested that population-specific prediction equations might be developed for body composition assessment.

**Conclusions:** The assessment of body composition in children is essential to monitor nutritional status. Since body composition prediction equations are population specific, there is a need for a valid equation in Tunisian children.

**Keywords:** Deuterium dilution, body composition, total body water, fat free mass, impedance analysis, prediction equation.

### **Country**

Tunisia

### **Institution**

Nutrition Department, Higher School of Health Sciences and Technics, University of Tunis El Manar, Tunis, Tunisia

**Primary author:** Dr BEN JEMAA, Houda (Nutrition Department, Higher School of Health Sciences and Technics, University of Tunis El Manar, Tunis, Tunisia)

**Co-authors:** Prof. AOUIDET, Abdallah (Nutrition Department, Higher School of Health Sciences and Technics, University of Tunis El Manar, Tunis, Tunisia); Dr MANKAÏ, Amani (Nutrition Department, Higher School of Health Sciences and Technics, University of Tunis El Manar, Tunis, Tunisia); Dr BEN SLAMA, Fethi (Institute of Public Health, Tunis, Tunisia); Dr BEN HMAD, Halima (Nutrition Department, Higher School of Health Sciences and Technics, University of Tunis El Manar, Tunis, Tunisia); Prof. JAMOSSI, Henda (Research Unit: Obesity: etiopathology and treatment, UR18ES01, National Institute of Nutrition and Food Technology, Tunis, Faculty of Medicine of Tunis, University of Tunis El Manar, Tunis, Tunisia); Dr KARMOUS, Inchirah (Nutrition Department, Higher School of Health Sciences and Technics, University of Tunis El Manar, Tunis, Tunisia); Dr KHLIFI, Sarra (Nutrition Department, Higher School of Health Sciences and Technics, University of Tunis El Manar, Tunis, Tunisia)

**Presenter:** Dr BEN JEMAA, Houda (Nutrition Department, Higher School of Health Sciences and Technics, University of Tunis El Manar, Tunis, Tunisia)

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