Assessment of body composition in epidemiological studies: evaluation of methods for undernourished 6 to 10 year old children in India

Project: 295

Dr Chandon Chattopadhyay, MD Paediatrics MIH

Institute of Child Health, S.B. Devi Charity Home, 5, Gulu Ostagar Lane, 700006 Kolkata, India

Background: In many developing countries, the prevalence of undernutrition is still high in children. Bioelectrical impedance analysis (BIA) is a suitable method of estimating body composition in children, but there is little information on applicability of prediction equations for the Indian pediatric age group.

Objective: We assessed applicability of BIA in a large epidemiological field survey and evaluated BIA equations with skinfold thickness measurements in a population of 6 – 10 year old prepubertal school children with a high prevalence of malnutrition.

Design: Fat free mass (FFM) and percentage body fat (%BF) of 921 pre-pubertal children were measured by BIA and skinfold thickness in a cross-sectional epidemiological survey in public schools of Calcutta. The Bland-Altman approach was used to evaluate 18 published pediatric prediction equations.

Results: We observed large differences in agreement among the various BIA and skinfold prediction equations. The best agreement had the skinfold equation of Slaughter and the BIA equation of Houtkooper, which had the same FFM variance, with a low bias of – 0.08 kg with 95% limits of agreement of –2.09 kg/ -1.93 kg for FFM and a bias of 0.45% with 95% limits of agreement of – 8.1 %/13.2 % for %BF.

Conclusion: BIA and skinfold analysis are not interchangeable for evaluation of individuals but provide good comparability in epidemiological studies. The recommended equations for prepubertal Indian children and malnourished children are the equations of Slaughter for skinfolds and of Houtkooper for BIA.

KEY WORDS body composition, bioelectrical impedance analysis, skinfold thickness, children, malnutrition, ethnicity, Indian, epidemiologic surveys