Proceedings of the Nutrition Society (2010), **69 (OCE1)**, E120 doi:10.1017/S0029665109993089

Over- and undernutrition: challenges and approaches. 29 June–2 July 2009

The new UK body-fat references expose the overfat children classified as normal weight by the BMI

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It is widely known that the BMI has a number of limitations when used to assess overweight and obesity in children. This position is in part a result of its inability to differentiate between fat and fat-free masses, resulting in low sensitivity[1]. Recently, references for body fatness using bioelectrical impedance analysis (BIA) have been developed for the UK childhood population[2]. The prevalence of overweight and obesity and the prevalence of overfat and obesity were compared in a sample of children from low-income schools within London.

A total of 1088 Caucasian children from schools predominantly in east London boroughs aged between 5 and 13 years were selected for analysis. Height and weight were measured and BMI calculated. Percentage body fat (%BF) was predicted using BIA (Tanita BC418; Tanita UK Ltd, Yiewsley, Middlesex, UK). Both measurements were converted to a standard deviation score based on the current UK reference data[2,3]. The percentage of children exceeding the International Obesity Task Force (IOTF) cut-off for overweight and the proportion exceeding the BIA cut-off for overfat was calculated[2,4]. The percentage of the original sample of children misclassified as either overweight and obese or normal weight by BMI was subsequently determined using %BF as the criterion.

In this sample 23% (*n* 254) of children were classified as overweight and obese based on the IOTF BMI cut-off, which contrasted with 30% (*n* 330) of the children classified as overfat and obese based on BIA. Further analysis of the data indicated that within the 23% of children, twenty-seven did not have excess body fat. However, within the group of children classified as normal BMI (*n* 834) 103 children were identified as having excess body fat. On a whole-group basis these data equated to 2.5% being misclassified as overweight and obese based on IOTF BMI and 9.5% being misclassified as normal BMI.

This study is the first to quantify the misclassification of a sample of UK children by BMI using the UK %BF references. These results indicate that whilst a relatively small number are wrongly classified as overweight and obese, a substantial number of children with high body-fat levels are missed using BMI. These findings are in general agreement with an earlier study[5]. Whilst this group cannot be considered representative of UK children in general, the findings, if reproduced on a larger scale, would suggest current national data may seriously under-represent the true prevalence of children at risk of morbidity related to excess body fat. This widely-acknowledged but generally-ignored limitation of BMI should be considered when prevalence rates based on BMI are communicated and interpreted.

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