

ORIGINAL RESEARCH COMMUNICATION

Evaluation of formulas for calculating total energy requirements of preadolescent children with cystic fibrosis^{1,2,3}

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Background: To support age-appropriate growth and to prevent and treat malnutrition in children with cystic fibrosis (CF), energy requirements for those children are often set above the requirements for healthy children. Care providers use one of several empirically derived formulas to calculate energy requirements, yet the validity of these formulas has seldom been tested.

Objective: We evaluated 6 proposed formulas for calculating energy requirements in children with CF against a total energy requirement for children with CF (TER-CF) derived from measured total energy expenditure, fecal fat energy loss, and the theoretic energy required for age-appropriate tissue accretion.

Design: Subjects were children aged 6–8 y who had CF and pancreatic insufficiency. Calculated TERs from each formula were evaluated against TER-CF by using summary statistics, regression analysis, and residual plots.

Results: Subjects ($n = 53$) had suboptimal nutrition and growth status and mild-to-moderate lung disease. The formula that most closely (within 2%) approximated TER-CF was the estimated energy requirement (EER) formula at the active level (EER_{act}). Regression analysis of TER-CF onto calculated TER from each formula yielded the best indexes of model fit for the EER_{act} formula; residual plots of the EER_{act} formula were tightly and normally distributed around zero.

Conclusions: The EER_{act} formula should be used to establish TER-CF in children in this age group who have mild-to-moderate CF. Changes in weight, height, and other indicators of nutritional status must be monitored to modify TER-CF as needed to support individual patient care goals.

Key Words: Doubly labeled water • validation • energy expenditure • energy requirement • cystic fibrosis

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