Letter to the Editor: comment on 'Diet quality index as a predictor of treatment efficacy in overweight and obese adolescents: The EVASYON study'

Camila E. Orsso[1*], Wagner L. Ripka[2*], Carla M. Prado[1]

[1]Department of Agricultural, Food and Nutritional Science, University of Alberta, Edmonton, AB, Canada.

[2]Graduate Program in Biomedical Engineering, Universidade Tecnológica Federal do Paraná, Curitiba, PR, Brazil.

*Co-first authors.

Corresponding author:

Carla M. Prado, PhD

4-002 Li Ka Shing Center for Health Research Innovation, University of Alberta, Edmonton, Canada T6G 2P5.

E-mail: cprado@ualberta.ca

Phone: 780.492.7934

Abbreviations: BMI, body mass index; FMI, fat mass index

Dear Editor,

The limited effectiveness of approaches to curb childhood obesity epidemic highlights the need for exploring effective interventions and improve health outcomes. The study by De Miguel-Etayo et al. provides valuable information illustrating that adherence to 13-month dietary intervention, impacted body composition in children with overweight and obesity aged 13-16 years [1]. This is an interesting and comprehensive study; however, our ability to interpret and apply the findings would benefit from additional clarification on methodological approaches and considerations of selected study limitations.

Although the challenges of assessing anthropometric and body composition variables in four cities are obvious, it is important to note the limitations of body mass index (BMI) and fat mass index (FMI) used to estimate body composition. Although these indexes are commonly employed as surrogate measures of adiposity, they have inherent limitations; BMI does not discriminate fat mass from other compartments. Additionally, FMI was assessed using the skinfold technique, which flaws have been well-described, especially in the obesity pediatric population [2]. Challenges include the accurate assessment of measurement sites, errors due to excess body weight, and high intra- and inter-raters variability may led to measurement errors [2]. For example, compared to dual-energy x-ray absorptiometry, skinfold thickness was shown to underpredict fat mass in children with overweight and obesity (bias of 9.0% in boys and 11.1% in girls) [3]. Importantly, the equation chosen to estimate fat mass has not been described. Has a population-specific equation been used?

In regards to the statistical analysis, the main finding was based on pseudo-R^2 values from regression modelling. Although regression analysis is a powerful method to assess the relationship

between variables, which type of pseudo R^2 indices was used (e.g. Enfron's, McFadden's, or Cox & Wells) and what were the associated modelling errors? [4]. How was multicollinearity considered in the analysis (i.e. total energy intake and macronutrient distribution) and how were these entered in the regression model? A particularly intriguing question is whether the assumption of normality between non-adherent and adherent groups was overlooked when applying the Cohen's d test, given most variables collected from males were normally distributed (compared to females, which were not), and that sexes were combined in the analysis. Would sex and/or normality considerations impact the findings?

The rationale for choosing the Schofield's equation to estimate basal metabolic rate and, hence total energy expenditure was not reported. This equation was developed for individuals of normal-weight and previous studies have highlighted its limitations in the pediatric population with obesity [5].

Finally, we are unclear where the numbers provided for time to determine physical activity adherence during the intensive and extensive phase (42 ± 5% and 71 ± 5%) come from. Additional clarification on these topics would be greatly appreciated.

References

[1] De Miguel-Etayo P, Moreno LA, Santabárbara J, Martín-Matillas M, Azcona-San Julian MC, Marti del Moral A, et al. Diet quality index as a predictor of treatment efficacy in overweight and obese adolescents: The EVASYON study. Clin Nutr 2019;38:782–90. doi:10.1016/j.clnu.2018.02.032.

[2] Watts K, Naylor LH, Davis EA, Jones TW, Beeson B, Bettenay F, et al. Do skinfold accurately assess changes in body fat in obese children and adolescents? Med Sci Sport

Exerc 2006;30:439–70. doi:10.1249/01.mss.0000191160.07893.2d.

[3] González-Ruíz K, Medrano M, Correa-Bautista JE, García-Hermoso A, Prieto-Benavides DH, Tordecilla-Sanders A, et al. Comparison of bioelectrical impedance analysis, slaughter skinfold-thickness equations, and dual-energy x-ray absorptiometry for estimating body fat percentage in colombian children and adolescents with excess of adiposity. Nutrients 2018;10:1–14. doi:10.3390/nu10081086.

[4] Smith TJ, McKenna CM. A comparison of logistic regression pseudo R2 indices. Mult Linear Regres Viewpoints 2013;39:17–26.

[5] Hofsteenge GH, Chinapaw MJM, Delemarre-van De Waal HA, Weijs PJM. Validation of predictive equations for resting energy expenditure in obese adolescents. Am J Clin Nutr 2010;91:1244–54. doi:10.3945/ajcn.2009.28330.