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Abstract

Purpose

When conducting analyses of child weight growth trajectories, researchers commonly use Z-scores from a standard instead of the observed weights. However, these Z-scores, calculated from cross-sectional data, may introduce methodological limitations when used in the context of longitudinal analyses. We assessed analytic limitations when analyzing infant growth data with three anthropometric measures: weight and the corresponding Z-scores and percentiles from a standard.

Methods

We undertook a series of Monte Carlo simulations and compared tests of differences in postnatal weight change across time (growth velocity) between two exposure groups. Models with the observed weight outcome were compared to the corresponding weight WHO Z-score or weight percentile outcomes. We calculated power, type I error, and median product term coefficient estimates to assess differences between the models.

Results

There was lower power to detect velocity differences across exposure groups for WHO Z-scores and percentiles as outcomes compared to the use of observed weight values. We also noted instances in which velocity differences between exposed and unexposed groups were in the opposite direction in analyses with WHO Z-score outcomes.

Conclusions

In our simulations of infant weight velocity differences across exposure groups, we observed lower power and effect inconsistencies when applying a standard-derived Z-score transformation. These results emphasize the need for careful consideration of the appropriate scale when assessing infant growth trajectories across categorical groups.

Introduction

Analyses of growth trajectories are expanding in tandem with the growing interest in life course epidemiology and the increased availability of longitudinal data collected during the

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