

Assessing Effects of an Intervention on Bottle-Weaning and Reducing Daily Milk Intake from Bottles in Toddlers Using Two-Part Random Effects Models

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Abstract : Two-part random effects models have been used to fit semi-continuous longitudinal data where the response variable has a point mass at 0 and a continuous right-skewed distribution for positive values. We review methods proposed in the literature for analyzing data with excess zeros. A two-part logit-log-normal random effects model, a two-part logit-truncated normal random effects model, a two-part logit-gamma random effects model, and a two-part logit-skew normal random effects model were used to examine effects of a bottle-weaning intervention on reducing bottle use and daily milk intake from bottles in toddlers aged 11 to 13 months in a randomized controlled trial. We show in all four two-part models that the intervention promoted bottle-weaning and reduced daily milk intake from bottles in toddlers drinking from a bottle. We also show that there are no differences in model fit using either the logit link function or the probit link function for modeling the probability of bottle-weaning in all four models. Furthermore, prediction accuracy of the logit or probit link function is not sensitive to the distribution assumption on daily milk intake from bottles in toddlers not off bottles.

Keywords : two-part model, semi-continuous variable, truncated normal, gamma regression, skew normal, Pearson residual, receiver operating characteristic curve

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