Comparing performance between log-binomial and robust Poisson regression models for estimating risk ratios under model misspecification

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Abstract

Background: Log-binomial and robust (modified) Poisson regression models are popular approaches to estimate risk ratios for binary response variables. Previous studies have shown that comparatively they produce similar point estimates and standard errors. However, their performance under model misspecification is poorly understood.

Methods: In this simulation study, the statistical performance of the two models was compared when the log link function was misspecified or the response depended on predictors through a non linear relationship (i.e. truncated response).

Results: Point estimates from log-binomial models were biased when the link function was misspecified or when the probability distribution of the response variable was truncated at the right tail. The percentage of truncated observations was positively associated with the presence of bias, and the bias was larger if the observations came from a population with a lower response rate given that the other parameters being examined were fixed. In contrast, point estimates from the robust Poisson models were unbiased.

Conclusion: Under model misspecification, the robust Poisson model was generally preferable because it provided unbiased estimates of risk ratios.

Keywords
Author Keywords

Log-Binomial Regression Highly Cited Articles

Log-binomial regressionRobust (modified) Poisson regressionModel misspecificationRisk ratioLink function misspecification

Keywords Plus

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