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Overestimation of Measures of Association using Inadequate Multivariate Models for Dichotomous Outcomes.

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INTRODUCTION: The right selection and application of statistical assumptions allow the adequate modelling and inference of health outcomes. The objective was to evaluate different measures of association using different modelling strategies for dichotomous outcomes.

METHODS: A cross-sectional study was conducted to determine the prevalence of latent tuberculosis infection (LTBI) in prisoners incarcerated in two prisons from the Valle de Aburrá in 2013. We compared the prevalence ratio (PR) and odds ratio (OR). To determine the associated factors with a positive TST, the measures of association were estimated by standard logistic regression (SLR), and LR with generalized estimation equations (GEE) and binomial regression with adjusting standard errors (SE). We adjusted with GEE and SE due to clustering correlation by prison.

RESULTS: The prevalence of LTBI in prison one was 80.6% (95% CI 77.7–83.5) and in prison two: 64.8% (95% CI 56.3–73.2). The measures of association were overestimated using logistic regression methods, in particular with SLR; for example, with prior incarceration we obtained: Binomial: PR: 1.14, 95% CI 1.06–1.22; GEEO: 1.67, 95% CI 1.11–2.49 and SLR: OR: 1.76, 95% CI 1.13–2.72.

CONCLUSIONS: The OR and GEEO were overestimated up to 54% when LR models were used, and their confidence intervals were more precise when Binomial Regression was used. The measure of association and the right statistical model should be selected according to the prevalence of the outcome.

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