Author's response to reviews

Title: Estimating Adjusted Prevalence Ratio in Clustered Cross-Sectional Epidemiological Data

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Point-to-point response to Manuscript MS- 8655308432197625: Estimating Adjusted Prevalence Ratio in Clustered Cross-Sectional Epidemiological Data

Dear Dr. Iratxe Puebla,

Thank you for accepting our paper for publication in BMC Medical Research Methodology. We have improved our manuscript by carefully addressing the comment of the reviewer in the revised manuscript. We thank again you and the reviewers for the constructive comments that, we believe, have improved the manuscript.

RESPONSE TO REVIEWER'S COMMENT

Answers for Reviewer

Essential Revision

Authors must clearly explain the interpretation of the estimated PR for logistic models with random effects in the method and discussion sections.

Several investigators interpret the regression coefficients (or the odds ratios) obtained from the logistic model with random effects in the same way as in the usual logistic regression model, by conditioning on the random effects (Larsen et al, 2000; McCulloch and Searle, 2001, Urbach and Austin, 2005). According to Hardin and Hilbe (2003), when explicitly modeling the source of heterogeneity in the logistic regression with random effects, the fixed regression parameters have an interpretation for individuals, which is subject specific. This implies that they should be interpreted as effects of covariates on a typical subject in the study (Andreozzi et al, 2006). Thus, as an illustration using our application regarding impact of ivermectin in the Trichuris infection, the estimated PR for logistic models with random effects represents the ratio of the probability of a given child having Trichuris infection if he/she receives ivermectin compared to the probability that the same child having Trichuris infection if he/she does not receive treatment. In this way the PR is adjusted for unobserved individual characteristics.

Alternatively, population-averaged estimates for the regression coefficients can be obtained using approximate formulae as suggested by Zeger et al (1988), which can be interpreted in terms of the response averaged over the population. In some situations, however, the subject specific interpretation is of more interest than its average effect on a population as a whole (Lindsey and Lambert, 1998). Another approach was proposed by Larsen and colleagues (2000), who discussed the interpretation of both fixed and random effects parameters in the context of logistic regression with random effects. They proposed a measure for the fixed effect called median odds ratio (MOR) in order to take into account the fact that, in practice, the procedure of conditioning in the random effects is unrealistic because the random effects are unobservable.

We have included this information in method and discussion sections.