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Method for Sample Size Determination for Cluster Randomised Trials Using the Bayes Factor

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Abstract

Determining the sample size is a key step for a robust research design, yet most current methods for sample size determination are based on the null hypothesis significance testing (NHST), an approach with multiple pitfalls. Methods using the Bayes factor as an alternative for hypothesis testing are still scarce in multilevel models. We have designed a method for sample size determination for two-treatment parallel cluster randomised trials using the Bayes factor. In this method, the sample size—either cluster size or the number of clusters—is determined to ensure a probability of finding a Bayes factor larger than a user-specified threshold. Through the simulation of realistic scenarios, we evaluated the effect of several factors influencing the required sample size. The results of this simulation study will be presented, along with general recommendations for a priori sample size determination in cluster randomised trials, and an introduction of the R functions available to researchers for this purpose.

Keywords

Multilevel, sample size, Bayes factor

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