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LETTER TO THE EDITOR

Clarification of some issues using Bayesian methods and model selection in meta-analysis and reporting

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We thank Dr. Bajpai for his interest in our recent meta-analysis study [1]. We agree that the Bayesian approach is fundamentally different from the frequentist approach. However, either approach aims to produce an estimate as close as possible to the true value. Thus, the estimates from the two approaches can often be very similar. In our study, the estimates from the two approaches were not exactly the same. In supplementary Fig. 1 of our study [1], the difference between the estimates in the two methods was shown in ten thousandths, which was not reflected in the reported results with the nearest hundredth [1]. Also, the corresponding 95% confidence intervals were different.

We also agree with Dr. Bajpai that the comprehensive analysis report helps open science and promote a shared research knowledge system. However, given the total number of words allowed by the journal for reporting, we followed, whenever applicable, the meta-analyses of observational studies in epidemiology (MOOSE) [2] and the Preferred Reporting Items for Systematic Reviews and Meta-analyses statement (PRISMA) [3]. This procedure allowed us to adopt a commonly practical reporting approach. We justified using the Bayesian approach for this meta-analysis, described how the Bayesian hierarchical meta-analysis model was employed, along with the corresponding formulas, and provided the necessary citations for the methodology to develop and use the existing literature. Additional details will be available on request by interested readers.

Like many other meta-analysis studies that we have reported [4–10], we did not select the random-effect model based on the significance of Cochran's *Q* test only. Instead, we also considered in the model selection that… "the participants from the original studies were different in the aspects of sex, age, race, ethnicity, regions, and the fact that the studies had different designs" [1]. Furthermore, we conducted subgroup analyses to investigate heterogeneity in the meta-analysis. We agree with Dr. Bajpai that reporting prediction intervals of the estimate has some advantages; however, in this meta-analysis, we instead reported the estimate and corresponding confident intervals, as well as consistency measures. As stated in the method section [3], the reporting of this meta-analysis was guided by MOOSE [2] and by PRISMA [3] when applicable. These guidelines, endorsed by top medical journals [11], recommend "presentation of the results of each meta-analysis done, including confidence intervals and measures of consistency." [3]

Declarations

Conflict of interest The authors declare no competing interests.

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