Reply to ''Decibans: it is time to weight the evidence about diagnostic accuracy''

Respuesta a «Decibanes: es hora de pesar la evidencia sobre exactitud diagnóstica»

Dear Editor:

I have read with great interest the letter by Modesto and Medina-Villanueva[1] on the proposed use of weights of evidence and decibans measures in intensive care medicine research, and I agree with such methodological reflection where such probability estimates allow better intuition in the confirmation of clinical results, similar to Bayes factor (BF) values.[2]

The BF is ideally suited to strengthen various statistical conclusions from clinical data. For example, it is useful for diagnostic prediction investigations such as the one referred by Modesto and Medina-Villanueva[1] where area under the ROC curve (AUROC) findings are reported, these values can be converted to effect size (ES; e.g., OR, *d*, *r*)[3] to estimate the degree of probative strength of this diagnostic test given the data.[2] Likewise, it is possible to consider the AUROC cutoff point (0.5) as an important inclusive value in the Bayesian intervals (BI) of the convertible effect (*r*) of the AUROC to provide greater certainty in the interpretation of the existence of the 95% probability of finding such a measure of interest among such BIs given the data. This is essential to enhance the credibility and replicability of diagnostic studies using the AUROC.

Convertible ES are essential for the integration of future diagnostic prediction meta-analyses with the alternative of establishing adequate heterogeneity (variability of effects), for example, if a study with binary ES (OR) does not present adequate heterogeneity, it has the option of using another standardized ES (correlation coefficient or standardized mean difference).[3]

Another Bayesian model of interest is the Bayesian A/B test that contrasts the difference between two proportions of two different groups considering the assignment of prior distributions and the control of such sample data.[4] Simultaneously it evaluates how likely it is that such events occur according to the logarithmic likelihood ratio scale ($\log OR < 0$, $\log OR > 0$). This measure is most useful because it fits a normal distribution for simultaneous assessment, which starts with equal odds for both proportions (equal prior distributions), then proceeds to analyze the pooled data by contrasting the BF towards both events ($\log OR < 0$, $\log OR > 0$). It is possible to determine the quantitative weight of evidence in a similar way as referred to in the commented article1 by multiplying 10 by the logarithmic scale of the BF to confirm decisive evidence (values greater than 20) of the higher frequency group ($\log OR > 0$), and even to reporte the negative decisive evidence of the other clinical event ($\log OR<0$). In addition, it allows establishing the posterior probability (this measure is stable beyond the reporting of more data) given the transformation of the obtained ES: exp ($\log OR$) = OR, and OR to probability = OR/(OR + 1) and their respective intervals to report what are realistic probabilities of participants having such medical outcomes beyond significance values.[4] This is useful for estimating COVID-19 infection rates according to groups and comorbid clinical conditions,[4] such as the study replicated by Ramos-Vera[2] where the comparison of the proportions of cases (COVID-19 infected patients) and controls (healthy adults) reporting measures of human leukocyte antigen (HLA) genetic polymorphisms was evaluated, following the recommendation of the Bayesian Neurology Group-Texas (BNG-TX)4. Bayesian models are also essential in the development of clinical trials in acute care research.[5] Therefore, the joint application with other measures such as weights of evidence and decibans are essential to methodologically strengthen greater practical credibility in intensive care medicine research and by COVID-19.

References

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C. Ramos-Vera

Área de investigación, Facultad de Ciencias de la Salud, Universidad Cesar Vallejo, Lima, Peru
E-mail address: cristony_777@hotmail.com