

# Reply to the letter: The evidence of Bayesian A/B testing in the contrast of clinical events by COVID-19

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## Dear Editor:

We reviewed the comments made by Cristian Ramos-Vera with great interest, and we thank him for his comments. His comments will allow us to lead the reading from the “standard framework of frequentist statistics based on significance assumptions” towards Bayesian models and thus avoid dichotomous biases for future interests in the manuscript.

Our team has applied Bayes’ theorem in cervical cancer diagnostic studies<sup>1</sup>, however, as Bayesian methods are diverse, in this study we did not apply this analysis, which according to the analysis of the letter agrees with our findings.

We know that case-control studies are subject to the action of different biases, so in this study, we take the necessary precautions to reduce and avoid them in the context of the Peruvian lockdown due to COVID-19<sup>2</sup>. Our main objective was not to generalize their findings but to know the risk factors of the rural Andean population for COVID-19, however, we agree that the Bayesian analysis deepens in refining the statistical conclusions and provides better quality to the clinical response<sup>3</sup>.

Given that the p-value is not sufficient for clinical interpretation<sup>4</sup>, certain factors (such as effect size and sample size) can undermine the conclusions, resulting in large amounts of bias. One of our limitations was the sample size since in the context of confinement and social distancing it has been difficult for us to voluntarily enroll patients in the study. The applied Bayesian analysis has highlighted this small sample size as the cause for the wide ranges for arterial hypertension and Diabetes mellitus type 2 as risk factors. Further studies are required to evaluate on a large scale the risk factors for COVID-19 in the Andean and Amazonian populations, improving the Peru’s

investment priorities in science and technology<sup>5</sup>.

As noted in the letter, the Bayesian approach can be very useful in SARS-CoV-2 research, improving the traditional statistical approach, thus, scientific paradigms are changing as is being seen in levels of evidence, levels of significance, and scientific writing<sup>6-7</sup>. We believe that we have contributed to the discussion about the risk factors of the Andean Peruvian population against COVID-19 in a perfect way.

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