



Association between serum 25(OH)D and hematological markers of erythropoiesis: the curse of large numbers, the treachery of p value

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The study by Doudin et al. [2], exploring the association between serum 25(OH)D and hematological indices in adolescents, stands out for the wise use of cross-sectional data from a German cohort to explore a novel issue related to vitamin D.

The authors' interpretation of the findings is misled by the use of p value. Applying it to assess associations whose underlying plausibility is ignored and is not suggested by the correlation coefficients, easily leads to false-positive findings. In fact, p -values are strongly related to sample size [6], "sometimes attracting attention to very small effects that have little real-world importance" [1].

The authors acknowledge that "the correlation coefficients and the effect sizes are very small" [2]. Indeed, the correlation coefficient estimates range from $r = -0.04$ to $r = 0.08$ (very close to $r = 0$, i.e., absence of correlation), and the differences on hematological indices by levels of serum 25(OH)D are minimal (e.g., Hb [g/dl] 1st tertile: 13.7 ± 1.2 ; 2nd tertile: 13.5 ± 1.1 ; 3rd tertile 13.6 ± 1.1), in spite of the low estimated p values. None of

the "statistically significant" differences found have a clear "clinical relevance" [3].

This frequent methodological error prompted methodologists and editors to discourage the widespread use of p values and to promote the use of alternative measures, with scarce success [4]. "False positive findings are detrimental to science and society, as once published, they accumulate persistent untrue evidence" [5].

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Ana Luísa Papoila: critical reading of the article by Doudin et al., review of the statistical analysis, and writing this manuscript.

Luís Pereira-da-Silva: critical reading of the article by Doudin et al., and contributed to the final manuscript.

All authors read and approved the final manuscript.

Compliance with ethical standards

Conflict of interest The authors declare that they do not have a financial relationship with the organization that sponsored the research.

Abbreviations 25(OH)D, 25-hydroxyvitamin D

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