



Letter to the editor: Phosphorus as predictive factor for erectile dysfunction in middle aged men: A cross sectional study in Korea; Methodological issues to avoid prediction fallacy

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To the editor:

We read the paper written by Min et al. [1] and published in *Investigative and Clinical Urology* in 2016. The authors aimed to study the effect of serum phosphorus on erectile dysfunction (ED) and the relationship with other clinical variables. It was concluded that phosphorus is a significant predictor of ED and a strong factor that can be modified in middle age. However, although this was a valuable investigation and its findings were very interesting, some methodological issues should be considered.

First, Min et al. [1] evaluated the predictive performance of serum phosphorus on ED in a cross-sectional study, whereas longitudinal studies are most important for making assumptions for clinical prediction models [2]. In other words, the temporality assumption (the dependent variable has to occur after the independent variable) must be ensured in the prediction model. Thus, prediction models resulting from cross-sectional designs can be misleading [2,3].

Second, considering the predictive performance of serum phosphorus on ED to be significant is an optimistic interpretation. The internal and external validation of the

prediction model must be done through bootstrapping and split-validation, respectively [2,4].

Finally, it was not clarified how the normality of the studied variables was verified. The normality assumption should be ensured through histogram plots or the Kolmogorov-Smirnov statistical test [5,6]. Parametric statistical methods including one-way analysis of variance tests should be used when the normality assumption is verified. Otherwise, the analogous nonparametric test, i.e., the Kruskal-Wallis test, must be applied. In the study by Min et al. [1], all of the variables are considered to be normally distributed because no evaluation was done on the distribution of variables.

The take-home message for readers is that clinical prediction models that use cross-sectional models may be misleading.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

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