

Restriction of Parameters and the Common Issue of Multicollinearity in Multivariate Analysis [Letter]

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Dear editor

Chronic Obstructive Pulmonary Disease (COPD) is a commonly encountered disease worldwide, characterized by high prevalence, high mortality, and significant costs.¹ Smoking is widely recognized as the primary cause of COPD. Despite the critical role of smoking in the development of COPD and small airway disease (SAD), the current understanding of smoking cessation behaviors at different stages of COPD remains unclear. We congratulate Fan et al for their study investigating smoking cessation status and the factors influencing this status in patients with COPD.² The study aimed to explore the impact of demographic data, education level, COPD stages, dyspnea scores, quit interest and quit attempts on smoking cessation status. After a thorough review of their article, we offer the following comments to enrich the understanding of their study.

In the study, demographic characteristics of patients with quitting intention (91.7%, 95% CI: 88.53–94.07%) and quit attempts (73.6%, 95% CI: 68.9–77.7%) were presented along with percentages and confidence intervals. Typically, categorical data are presented with numbers and percentages, while continuous data are described using median and interquartile range or mean and standard deviation, depending on the distribution. The presentation of confidence intervals, however, is generally uncommon in this context and was not clearly understood.

Statistically, only more clinically significant parameters should be included in the multivariate analysis among those showing high correlation. In this regard, including all parameters that are expected to show high correlation -such as CAT and mMRC scores, FNTD and TCQ-SF scores, smoking per day, and smoking cost- could lead to multicollinearity problems, which may affect the accuracy of the results. Furthermore, in multivariate regression analysis, the number of parameters included should not exceed 1/5 or 1/10 of the number of patients with positive outcome. Given that 46 patients quit smoking after 1 year of follow-up in this study, the number (19 variables) is too large to apply multivariate analysis to maintain the fitness of the model.

Lastly, as the authors have mentioned, the fact that the patients included in the study did not receive smoking cessation treatment makes these results less representative of real-life scenarios.

Disclosure

The authors report no conflicts of interest in this communication.

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