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LETTER

From Model to Bedside: What Kind of OSA Risk Prediction Tools Do We Need More of? [Letter]

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Dear editor

We carefully read the recent article "Construction and Validation of a Machine Learning-Based Risk Prediction Model for Sleep Quality in Patients with OSA" by Tong.[1] The authors constructed a model for predicting sleep quality in OSA patients based on the LightGBM algorithm and achieved good performance in the validation set and also identified key predictors using the SHAP method. This study is important in advancing the identification of sleep disorders in OSA patients and the development of clinical decision support tools. However, after reading the full paper in detail, we have a couple of doubts that we would like to take advantage of this format hoping to communicate with the authors.

First, the authors screened and modeled 6 key variables (coffee consumption, weekly exercise, anxiety, depressive symptoms, OSA duration, and ODI) when performing predictive modeling. However, we note that no assessment of covariance (variance inflation factor) was seen in the paper for the variables that were ultimately included in the model.[2] Indeed, anxiety patients are often accompanied by depressive symptoms in the later stages of life.[3] This co-morbid state has strong linear correlations, and simultaneous incorporation into the model without addressing covariance may affect model stability and interfere with the significance of the explanatory variables of the SHAP.

Second, sleep disorders are prevalent in patients with OSAHS, so the prevalence of sleep disorders in the authors' modeling data was as high as 70%, a rate that is consistent with the current state of clinical epidemiology research. In machine learning, however, differences between the two groups may lead to significant category imbalances. In most machine learning algorithms, the model tends to predict the category that accounts for a greater proportion of the population, which in turn reduces the ability to recognize the minority category (good sleep quality). However, the authors do not state whether this is corrected using techniques such as SMOTE oversampling, undersampling, or category weight adjustment.[4]

Finally, this study only uses whether the calibration curve is close to the ideal diagonal as the basis for model assessment in terms of model calibrability assessment. However, it is essentially a subjective visualization tool that cannot quantify the error between the model prediction probability and the actual outcome. In medical prediction modeling research, mainstream quantitative indicators such as the Brier score and the Hosmer-Lemeshow test can more objectively reflect the calibration performance of the model, which can help to improve the credibility and reproducibility of the model in clinical practice.[5]

We highly recognize the authors' application of machine learning methods to the hot clinical issue of predicting sleep disorders in OSA patients. As a reader with dual roles as an OSA patient and a physician, I am deeply impressed by the practical guidance of this study that regular exercise and appropriate noninvasive ventilation therapy play an important role in improving sleep quality. This study encourages us to pay more attention to the lifestyle management and treatment adherence of OSA patients.

Data Sharing Statement

Data sharing is not applicable to this article as no data were created or analysed in this communication.

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Author Contributions

Hongyu Pan: Methodology, Formal analysis, Writing - Original Draft; Yuchang Fei: Conceptualization, Methodology, Supervision, Writing - Review & Editing. All authors agreed on the journal to which this communication will be submitted; agreed on the final version accepted for publication; agree to take responsibility and be accountable for the contents of this communication.

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Disclosure

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this communication.

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