LETTER TO THE EDITOR

Calibration of Prediction Models of In-hospital Mortality in SARS-CoV-2 Patients Depends also on Data Quality

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Dear Editor,

The study by Rahmatinejad et al.[1] on the retrospective application of six outcome scores (national early warning score (NFWS), quick sequential organ failure assessment (qSOFA), early warning score (EWS), worthing physiological score (WPS), rapid acute physiology score (RAPS), rapid emergency medicine score (REMS)) on electronic data of 6,429 patients collected after admission to an emergency department due to severe acute respiratory syndrome-corona virus-2 (SARS-CoV-2) positivity is ambitious, but some points should be discussed.

A limitation of the study is its retrospective design. Disadvantages of a retrospective design are that missing data can no longer be supplemented, the accuracy of most data can no longer be checked, and information that would be desirable to include additionally can no longer be collected and supplemented. Since 28% of the data were missing, the reliability of the results is highly questionable.[1] To what extent did these missing data influence the results?

A second limitation of the study is that current medications were not included in the analysis. Because medications can be harmful especially when combined with other drugs and a person's actual morbidity, it is crucial to include current medications in the evaluation. None of the six applied scores considered drugs as a factor influencing a person's outcome. Drugs that particularly affect the outcome include antiepileptics, anesthetics, sedatives, analgesics, antiarrhythmics, chemotherapeutics, and immunosuppressants.

A third limitation is that the mental status was extracted from the electronic records but how mental status was assessed was not explained. In emergency situations, it is usually not possible to perform extensive, sophisticated neuropsychological testing that measures alertness, orientation, attention span, concentration, cognition (ability to think, understand, learn, remember), perception (how well one perceives what he sees or reads), memory, problem-solving, decision-making, verbal ability, and speech. Therefore, we should know what specific tests were performed and whether only awareness or orientation was assessed.

A fourth limitation is that current vaccination status was not included in the analysis. Of particular interest is whether a person included was vaccinated against SARS-CoV-2, with which brand, and in how many doses. Since the study period ranged from 29th February 2021 to 30th July 2021, it is conceivable that a number of the patients included were already vaccinated against SARS-CoV-2.

A fifth limitation is that the cause of death of non-survivors was not reported.[1] We should know whether these patients died from SARS-CoV-2 infection, from their previous co-morbidities, or from disease acquired during hospitalization. It would be also interesting to know how many days after admission these 1,690 patients died.

It is not mentioned how many of the included patients required mechanical ventilation, how many survived mechanical ventilations, and after how many days the survivors were discharged from the ICU.

Since SARS-CoV-2 can initially manifest not only in the lungs but also in extra-pulmonary organs, we should know whether SARS-CoV-2 positive patients with plain X-ray or CT of the lungs were excluded from the study or whether only PCR-positive patients were included, other than shown in the flowchart.[1,2]

In summary, when applying prediction models of in-hospital mortality in SARS-CoV-2 patients, complete data sets without missing values should be analyzed.

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(I) Research project: (a) Conception, (b) Organization, (c) Execution
(II) Statistical analysis: (a) Design, (b) Execution, (c) Review and critique
(III) Manuscript: (a) Writing of the first draft, (b) Review and Critique

Josef Finsterer's contributions to the manuscript encompassed tasks in sections I (a), I (b), I (c), as well as III (a) and III (b), helping shape the overall content.

Ethical Compliance Statement

The authors confirm that the approval of an institutional review board or patient consent was not required for this work. We confirm that we have read the journal's position on issues involved in ethical publication and affirm that this work is consistent with those guidelines. This article is based on previously conducted studies and does not contain any new studies with human participants or animals performed by any of the authors.

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