

Validity of Pneumonia Severity Assessment Scores in Low- and Middle-Income Countries: A Systematic Review and Meta-Analysis

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Abstract

Background

Several pneumonia severity assessment scoring systems have been developed, but the evidence of their utilisation in low- and middle-income countries (LMICs) remains limited. We sought to systematically investigate the evidence around the validity and performance of the existing pneumonia severity scores in adult patients diagnosed with community-acquired pneumonia in LMICs.

Methods

Medline (Ovid), Embase (Ovid), Cochrane Central Register of Controlled Trials, Scopus, and Web of Science were searched for eligible articles up to May 2020. Pooled estimates of the severity scores performance (sensitivity, specificity) at their high-risk cutoffs in predicting the reported outcome were estimated using the bivariate meta-analysis model. Heterogeneity was assessed using the I^2 index.

Results

Overall, 11 were eligible, of which, only six studies with sufficient data were included in the final meta-analysis that involved examining CURB-65 and CRB-65 scores. Both scores at a threshold ≥ 3 were related to an increased mortality risk, with pooled relative risks of 8.58 (95%CI: 3.48-21.18) and 4.83 (95%CI: 2.52-9.28) for CURB-65 and CRB-65, respectively. The predictive performance of CURB-65 and CRB-65 at their high-risk cutoffs, respectively, were as follows: the pooled sensitivity, 0.69 (95%CI: 0.25-0.94) and 0.04 (95%CI: 0.00-0.40); the pooled specificity, 0.89 (95%CI: 0.72-0.96) and 0.99 (95%CI: 0.95-1.00); and the area under the summary receiver operator characteristic curves, 0.90 (95%CI: 0.87-0.92) and 0.86 (95%CI: 0.83-0.89).

Conclusion

CURB-65 and CRB-65 at a cutoff ≥ 3 are strongly associated with mortality and appear to be valid scores for mortality prediction in LMICs. CURB-65 exhibited higher sensitivity and overall accuracy, compared to CRB-65.