

INTISARI

Latar belakang: Identifikasi awal anak dengan COVID-19 dalam periode rawat inap merupakan suatu hal yang penting untuk mengoptimalkan tatalaksana dan menyampaikan prognosis pasien.

Tujuan penelitian: Mengembangkan dan memvalidasi skor prediksi kematian COVID-19 anak.

Metode penelitian: Studi kohort retrospektif dengan subyek usia 1 bulan – 18 tahun yang menjalani rawat inap di RSUP Dr. Sardjito Yogyakarta, Indonesia dengan periode Maret 2020 – September 2021. Variabel prediktor kematian dinilai saat admisi rumah sakit dan dihitung nilai *likelihood ratio* (LR) positif dan negatif. Variabel dengan LR positif ≥ 2 dan negatif $\leq 0,5$ akan disusun menjadi suatu skor dengan metode Spiegelhalter Knill-Jones. *Area Under the Curve for Receiver Operating Characteristic* (AUC-ROC) digunakan untuk menentukan nilai *cut-off* dari total skor. Validasi internal dilakukan dengan menilai sensitivitas, spesifisitas, *likelihood ratio* positif, negatif dan akurasi.

Hasil penelitian: Pengembangan sistem skor melibatkan 136 subyek, 21 subyek (15,4%) memiliki luaran meninggal pada. Dari 13 variabel, enam variabel merupakan faktor prediktor kematian COVID-19 anak; tidak ada komorbiditas (LR 0,36; nilai skor -4), tidak ada takipnea (LR 0,34; nilai skor -1), ada hipoksemia (LR 3,85; nilai skor 7), tidak ada hipoksemia (LR 0,50; nilai skor -4), peningkatan kadar BUN (LR 3,08; nilai skor 7), ada MISC (LR 6,8; nilai skor 13), ada indikasi perawatan PICU (LR 2,26; nilai skor 5) dan tidak ada indikasi perawatan PICU (LR 0,29; nilai skor -7). Nilai AUC pada pengembangan skor adalah 0,91 (IK 95% 0,86 – 0,97), dengan nilai *cut-off* $\geq 2,5$. Delapan puluh empat subyek dilakukan validasi eksternal dengan nilai AUC 0,86 (IK95% 0,73 – 0,99), sensitivitas 78,57%, spesifisitas 85,71%, LR (+) 5,49, LR (-) 0,25 dan akurasi 84,52%.

Kesimpulan: Total skor $\geq 2,5$ dapat memprediksi secara valid mortalitas diantara anak yang menjalani rawat inap dengan COVID-19. Validasi eksternal dibutuhkan untuk meningkatkan kemampuan diagnostik skor prediksi COVID-19 anak.

Kata kunci: COVID-19, anak, mortalitas, prediksi, skor

ABSTRACT

Background: Early identification of children who hospitalized with COVID-19 is a great importance and may aid in delivering proper treatment and optimizing use of resources.

Aims: To develop and to validate the Pediatrics Covid-19 Mortality Prediction Score in hospitalized children with COVID-19.

Methods: A retrospective cohort study of children (1 months to 18 years old) was conducted from March 2020 – September 2021 in Dr. Sardjito Hospital, Yogyakarta, Indonesia. All variables whom the likelihood ratio positive ≥ 2 and negative ≤ 0.5 were developed as models of scoring by Spiegelhalter Knill-Jones method. The Area Under the Curve for Receiver Operating Characteristic (AUC-ROC) was used to assess the cut-off point of the total score. Internal validation was obtained to evaluate the sensitivity, specificity, positive-negative likelihood ratio, and accuracy of scoring.

Results: The development of scoring system included 136 patients, twenty-one (15.4%) were died during their hospitalization. From 13 variables, six were predictive factors of mortality. They are comorbidity (LR- 0.36; score -4), rapid breathing (LR- 0.34; score -1), hypoxemia (LR+ 3.85; score +7 and LR- 0.50; score -4), increase of ureum level (LR+ 3.08; score +7), MISC (LR+ 6.8; score +13), and needs of intensive care (LR 0.29; score -7). The mean AUC in the development cohort was 0.91 (CI95% 0.86 – 0.97) at an optimal cut-off value of ≥ 2.5 . The validation cohort included 84 patients, fourteen (16.67%) were died. The mean AUC with cut-off value ≥ 2.5 of validation cohort was 0.86 (CI95% 0.73 – 0.99), showing a sensitivity 78.57%, specificity 85.71%, LR+ of 5.49, LR- of 0.25, and accuracy of 84.52%.

Conclusion: Score ≥ 2.5 demonstrated a valid tool for predicting mortality among children who hospitalized with COVID-19. External validation is required to improve the predictive performance of our models scoring.

Keywords: COVID-19, children, mortality, prediction, score