Abstract

Background:- Tools to measure quality are becoming widespread and focus either on the outcomes of care or the processes of care. For intensive care units (ICUs), the main focus on research on outcome measurement has been on the development of mortality prediction models.

Purpose:- The aim of this study was to evaluate the performance of three general severity-of-illness scores, Acute Physiology and Chronic Health Evaluation [APACHE] IV, Simplified Acute Physiology Score [SAPS] II, and Mortality Probability Model [MPM] II24 systems in critical care departments of four hospitals in Egypt, i.e: mulicentre study.

Methods:- A prospective observational cohort study was performed on 873 patients admitted to the intensive care units of Kasr Alaini hospital, the new kasr Alaini teaching hospital, Nasser institute and Almokattam hospital between 13 October 2009 to 13 January 2010. The following data were collected over the first 24 hours of ICU stay: demographics, APCHE IV and SAPS II scores, MPM II24 variables, ICU outcome.

Measurements: Predicted mortality was calculated using original regression formulas. SMR was calculated with 95% confidence intervals. Calibration was assessed by using the chi-squared value from the Hosmer-Lemeshow test. Discrimination was evaluated by calculating area under the receiver operating characteristic curve [AU-ROC].

Results:- The observed ICU mortality was 24.17%. Predicted mortality by APACHE IV and SAPS II systems was different from actual mortality, whereas MPM II24 has the nearest prediction one [SMR for APACHE IV: 1.69, SAPS II: 1.47, MPM II24: 1.28]. All the models showed reasonable discrimination using the area under the receiver operating characteristic curve (APACHE IV, 0.833; SAPS II, 0.836; MPM II, 0.818) with the best for SAPS II. For same data sets, SAPS II demonstrated superior calibration to all the models. (SAPS II 11.557 [P = 0.172]; APACHE IV 12.914 [P = 0.115]; and MPM II24 17.830 [P = 0.023].

Conclusion:- Overall mortality prediction was underestimated by APACHE IV and SAPS II. MPM II was the nearest to predict outcome. Calibration of SAPS II was the best, making it the most appropriate model for comparisons of mortality rates in different ICUs.

Key words:- APACHE IV score; SAPS II score; MPM II score; mortality prediction.