### S-70.

**VALIDATION OF SIMPLIFIED ACUTE PHYSIOLOGY SCORE 3 (SAPS 3), FOR PREDICTING MORTALITY IN THE RESPIRATORY INTENSIVE CARE UNIT**

**AUTHORS:** V. Prasad, S. Mantha, G. Ramachandran

**AFFILIATION:** Nizam’s Institute of Medical Sciences, Hyderabad, India

**INTRODUCTION:** Several scoring systems have been developed over the years to predict ICU outcome. Of all the models developed, SAPS 3 is a recent one and has gained in popularity due to its large and varied developmental cohort. Most of the outcome prediction models do not perform equally well in other geographical settings. In this prospective study, we sought to validate SAPS 3 in a respiratory intensive care unit (ICU) in a tertiary care university-based hospital in South India.

**METHODS:** The sample size was calculated by standard methods using the odds ratio and was estimated to be 150 with a power of >0.8. Outcome of interest was ICU mortality. SAPS 3 data within 24 hours was collected in 150 adult patients admitted in ICU over a period of 12 months. Multivariate logistic regression analysis was applied after univariate analysis of the data. The data were validated using Hosmer-Lemeshow Goodness of Fit tests for calibration and ROC analysis for discrimination.

**RESULTS:** The ICU mortality was 24.67% (35/150). The median (interquartile range) of SAPS 3 score at ICU survivors was 50 (41 to 59) and 69 (59 to 83). SAPS 3 was found to predict ICU mortality on logistic regression analysis with good calibration (p=0.173) and discrimination (AUC=0.821 with 95% CI=0.74 to 0.89). Analysis also found that the ideal cut-off was 57 at which the sensitivity and specificity would be 84% and 71% respectively. Results of logistic regression analysis are depicted in the Table. Mortality predicted from our model for some SAPS 3 scores found in our sample are as follows: score (% mortality): 20 (1%), 40 (5.7%), 57 (21%), 60 (26%), 80 (66%), 100 (92%).

**DISCUSSION:** Risk prediction models developed in another country require validation and recalibration before being used to provide risk-adjusted outcomes within a new country setting. SAPS 3 score was validated in Central and Western Europe. Whereas, in another study, in a cohort of 28,357 patients from 147 Italian intensive care units, although discrimination was good, calibration turned out to be poor. Our findings indicate consistency in both calibration and discrimination of SAPS 3 scoring in predicting ICU mortality in our setting that consists of medical and surgical cases in need for ventilatory support.

**REFERENCES:**

### Logistic Regression Analysis for SAPS 3 Score

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Co-efficient</th>
<th>P value</th>
<th>Odds ratio</th>
<th>95% CIs for Odds ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.31276</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAPS 3 Score</td>
<td>0.08747</td>
<td>0.000</td>
<td>1.09</td>
<td>1.06 to 1.13</td>
</tr>
</tbody>
</table>

P value for overall predictive ability of SAPS 3 score for ICU mortality is 0.000 (Log-Likelihood = -64.181). Goodness-of-fit testing with Hosmer-Lemeshow method revealed P value of 0.173

### Results of Logistic Regression Analysis

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Co-efficient</th>
<th>P value</th>
<th>Odds ratio</th>
<th>95% CIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.73916</td>
<td>0.045</td>
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<tr>
<td>Albumin</td>
<td>-0.85788</td>
<td>0.007</td>
<td>0.42</td>
<td>0.22 to 0.79</td>
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<tr>
<td>A/G ratio</td>
<td>-0.55893</td>
<td>0.396</td>
<td>0.57</td>
<td></td>
</tr>
</tbody>
</table>

The P value for overall predictive ability of the model is 0.002 (Log-Likelihood = -77.506). Goodness-of-fit testing with Hosmer-Lemeshow method revealed P value of 0.499. Mortality predicted from our model for some serum albumin values (g/dl) found in our sample are as follows: albumin (% mortality): 1.0 (71%), 2.0 (51%), 2.6 (48%), 3.0 (30%), 4.0 (16%), 5.0 (7%).

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### S-71.

**AMONG NUTRITION CRITERIA, ADMISSION DAY HYPOALBUMINEMIA PREDICTS ICU MORTALITY**

**AUTHORS:** S. Mantha, G. Ramachandran, V. Prasad

**AFFILIATION:** Nizam’s Institute of Medical Sciences, Hyderabad, India

**INTRODUCTION:** The role of nutrition criteria in influencing mortality in intensive care units (ICUs) is controversial. In this prospective study, we sought to evaluate nutrition criteria in predicting mortality in a respiratory intensive care unit (ICU) in a tertiary care University-based hospital in South India. The ICU setting consists of medical and surgical patients requiring ventilatory support.

**Methods:** During a prospective observational study related to validation of SAPS 3 scoring system, nutrition criteria were collected in 150 adult patients admitted in ICU over a period of 12 months. Outcome of interest was ICU mortality. The data included body mass index (BMI), mid-arm circumference, triceps skin-fold thickness, abdominal girth, serum albumin, albumin/globulin (A/G) ratio, and hemoglobin. Data were collected in the first 24 hours of admission. For BMI, possible influence of malnutrition and obesity was studied. Multivariate logistic regression was applied after univariate analysis of the data. ROC analysis was done for discrimination.

**RESULTS:** The ICU mortality was 24.67% (35/150). Of the variables studied, albumin/globulin ratio and serum albumin were found to be significant on univariate analysis. Multivariate analysis by logistic regression analysis identified serum albumin as the sole independent predictor of ICU mortality. The results of logistic regression are depicted in the Table. The area under the ROC curve was 0.686 with 95% CI=0.594 to 0.778. Analysis also found that the ideal cut-off was 2.6 g/dl at which the sensitivity and specificity would be 68% and 66% respectively.

**DISCUSSION:** Nutritional status of an individual can affect the ICU outcome in several ways. Both Low BMI (malnutrition) and high BMI (obesity) are equally important. Low serum albumin is an indicator for pre-existing malnutrition and liver disease. Obesity with its adverse affects on respiratory physiology complicates the ICU course especially in those requiring ventilatory support. Paradoxically, obesity may improve outcome related to increased fat reserves to sustain the metabolic stress. In the present study, among the nutrition criteria, we could identify only the admission day serum albumin as the sole independent predictor of ICU mortality. Further studies are required to verify whether therapy targeted to correct hypoalbuminemia in the ICU improves the outcome.

**REFERENCES:**
4. O’Brien, J.M., Jr., et al., Care Med, 2006;34:738-44.
VALIDATION OF SIMPLIFIED ACUTE PHYSIOLOGY SCORE 3 (SAPS 3) FOR PREDICTING MORTALITY IN THE RESPIRATORY INTENSIVE CARE UNIT

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Abstract

Introduction and Methods
Results
Discussion and Conclusion
References

Introduction
Scoring systems have been developed over the years to predict ICU outcome. Of all the developed models, SAPS 3 is a recent one and has gained popularity in clinical settings and has also been used in a large and developed cohort (1). Most of the outcome prediction models do not perform equally well in other geographical settings. In this prospective study, we sought to validate SAPS 3 in a respiratory intensive care unit (ICU) in a tertiary care university-based hospital in South India.

Methods
The sample size was calculated by standard methods using the odds ratio and was estimated to be 153 with a power of 0.8. Outcome of interest was ICU mortality. SAPS 3 data within 24 hours was collected in 150 adult patients admitted in ICU over a period of 12 months. The electronic medical records were reviewed to get the data for the analysis of the data. The data were validated using Hosmer-Lemeshow Goodness-of-FIT test for calibration and ROC analysis for discrimination.

Results
The ICU mortality was 24.67% (35/147). The median (interquartile range) of SAPS 3 score in ICU survivors was 55 (49 to 65) and 80 (70 to 90) respectively. SAPS 3 was found to predict ICU mortality on logistic regression analysis with good calibration and discrimination (Hosmer-Lemeshow: Chi-Square = 6.31276; P value = 0.55): Results of multivariate logistic regression analysis were deployed after univariate analysis of the data. The data were validated using Hosmer-Lemeshow Goodness-of-FIT test for calibration and ROC analysis for discrimination. For univariate analysis, the SAPS 3 data between the survivors and non-survivors were analyzed using Mann-Whitney U test. A P value < 0.05 was considered significant. Analysis plan was to subject SAPS 3 data to multivariate logistic regression analysis and found significant on univariate analysis.

Hosmer and Lemeshow’s Goodness-of-FIT was used to test the calibration (2). For discrimination, the continuous data was separated for survivors and non-survivors and ROC analysis was performed. Area under the ROC curve was computed using nonparametric method described earlier (3).

Discussion
Risk prediction models developed in another country require validation and recalibration before being used to provide risk-adjusted outcomes within a new country setting (4). SAPS 3 score was validated in Central and Western Europe (5), Whereas, in another study a cohort of 28337 patients from 147 italian intensive care units, although discrimination was good, calibration turned out to be poor (4). Our findings indicate consistency in both calibration and discrimination of SAPS 3 scoring in predicting ICU mortality in our setting that consists of both medical and surgical cases intended for ventilatory support.

References
3. Hanley, J.A. & B.J. McNeil. 1982: USP, Hosmer-Lemeshow’s Goodness-of-FIT test for calibration and ROC analysis for discrimination. For univariate analysis, the SAPS 3 data between the survivors and non-survivors were analyzed using Mann-Whitney U test. A P value < 0.05 was considered significant. Analysis plan was to subject SAPS 3 data to multivariate logistic regression analysis and found significant on univariate analysis.

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