Original Article

The Comparison of Two Prognostic Scores PRISM III and SNAPPE II in A Neonatal Intensive Care Unit

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ABSTRACT

Background: Newborn survival rates in neonatal intensive care units (NICUs) are influenced by various factors, including birth weight, gestational age, and physiological indicators of illness severity. Traditional assessments such as APGAR scores have proven inadequate for predicting outcomes, necessitating the development of scoring systems like PRISM III and SNAPPE II. This study aims to evaluate and compare the predictive accuracy of PRISM III and SNAPPE II scores in assessing mortality among critically ill neonates admitted to a NICU.

Material & Methods: A prospective observational study was conducted at CSS Hospital, Subharti Medical College, Meerut, enrolling 120 neonates under 28 days of life between December 2022 and March 2024. Data were collected on demographic information, physiological parameters, and the scores calculated at admission and 24 hours later. Statistical analyses were performed using SPSS version 20.0 to assess the sensitivity, specificity, and predictive values of both scoring systems.

Results: Among 117 enrolled neonates (74.36% males, 25.64% females), the overall survival rate was 67.52%. The SNAPPE II score at admission and 24 hours indicated higher sensitivity for predicting mortality (81.58% and 73.68%, respectively), while PRISM III scores demonstrated lower sensitivity (78.94% at admission and 68.42% at 24 hours). The ROC curve analysis revealed SNAPPE II's AUC at 0.81 at 24 hours, while PRISM III's AUC was 0.85, indicating slightly higher overall discriminatory power. However, SNAPPE II's superior sensitivity emphasizes its potential for earlier identification of at-risk neonates.

Conclusion: The findings suggest that SNAPPE II is more effective in predicting neonatal mortality at 24 hours post-admission than PRISM III, highlighting its utility in clinical settings for timely risk stratification and intervention planning. The choice of scoring system should be tailored to the specific needs of the patient population and clinical environment, reinforcing the importance of accurate assessment tools in improving neonatal care outcomes.

Keywords: Neonatal mortality, PRISM III, SNAPPE II, NICU, diagnostic accuracy.

INTRODUCTION

Newborn survival rates in NICUs are affected by factors such as birth weight, gestational age, and physiological indicators of illness severity[1-6]. To improve predictions of mortality, morbidity, and prognosis, scoring systems have been developed, as initial reliance on APGAR scores, birth weight, and gestational age alone proved insufficient [6-8]. In critical neonatal care, severity scores are essential, as medical advancements do not always ensure better outcomes[9]. Neonatal mortality varies globally, from 6.4% in developed nations in 2013[10] to 36.7% in developing regions in 2009 [11], with disparities often linked to inadequate healthcare infrastructure and the distinct physiology of neonates[12-15]. The need for quantitative scoring systems arises from the inconsistency of subjective assessments, highlighting the importance of these tools for measuring illness severity[16].

PRISM-III (Pediatric Risk of Mortality), a widely recognized third-generation scoring system for pediatric intensive care, was introduced in 1996. Developed from data collected across 32 pediatric critical care units and 11,165 admissions, PRISM-III incorporates 17 physiological variables divided into 26 ranges, along with eight additional risk factors, making it adaptable to diverse pediatric populations[17].

For neonatal patients, the Score for Neonatal Acute Physiology (SNAP) was developed by Richardson DK in 1993. This system uses 34 variables, including laboratory results and vital signs, to assess the health status of newborns in NICUs. SNAP was validated through a study of 1,643 NICU admissions (114 deaths) in three hospitals and has been used to define patient populations, stratify risks in research, and allocate resources [18,19].

In 2001, Richardson DK et al. simplified SNAP to create SNAP II, reducing the number of variables from 34 to six, and later developed SNAPPE-II by adding three critical variables. SNAPPE-II proved effective in differentiating survivors from non-survivors and was easier to use than its predecessors. Both SNAP II and SNAPPE-II have become reliable tools for assessing illness severity and mortality risk, particularly in infants of various birth weights.[20]

Improving care for critically ill newborns in NICUs is a global priority. Effective resource utilization requires investments, and scoring systems like PRISM III and SNAPPE II are essential for organizing NICUs, enabling performance comparisons, and ensuring institution-independent applicability. Prognostic scores provide insights into the quality of care and aid in resource allocation by comparing predicted outcomes with actual results, ultimately enhancing cost-effectiveness.

Although PRISM III and SNAPPE II have been compared in various settings, further research is needed to evaluate their effectiveness in homogeneous groups of neonates. This need is especially pressing in countries like India, where studies on these scoring systems remain limited.

In advent of same, the present study was planned aimed to evaluate and compare the predictive accuracy of PRISM III and SNAPPE II in predicting mortality among critically ill neonates in a NICU, and to assess their correlation with observed mortality versus predicted mortality.

MATERIALS AND METHODS

Study design and Population

This was a prospective observational study conducted at the Department of Pediatrics, CSS Hospital, Subharti Medical College, Meerut. The study focused on neonates under 28 days of life, regardless of their gestational age, and included both genders. The study was conducted between December 2022 and March 2024. A total of 120 neonates were enrolled using a non-probability consecutive sampling technique, based on a sample size determined to achieve 80% power and a 95% confidence interval using GPower software.

Ethical approval was obtained from the Institutional Ethical Committee, and parents/guardians provided informed consent for their newborns to participate.

Inclusion Criteria

Neonates less than equal to 28 days of life as per irrespective of geastational age admitted to NICU as per IAP guidelines:

1. Requiring mechanical ventilation
2. Neonates with impending respiratory failure
3. Neonates with hypoxic ischemic encephalopathy
4. Neonates with respiratory distress syndrome
5. All types of shock/hemodynamic instability a) septic b) Hypovolemic c) bleeding - gastrointestinal, DIC, bleeding diathesis Cardiogenic d) Neurogenic
6. Severe acid base problems
7. Severe electrolyte disorder.

Exclusion Criteria

1. Those with congenital malformations,
2. Those who didn't give consent,
3. Home deliveries where APGARs were not known,
4. Those discharged against medical advice within 24 hours of admission.
5. Trauma cases

Methodology

Data Collection and Procedure: Upon admission to the Neonatal Intensive Care Unit (NICU), neonates' information, including name, age, gender, and admission date, was recorded. Within the first hour, SNAPPE-II and PRISM scores were documented and then recalculated 24 hours later. The NICU was equipped with essential monitoring and diagnostic tools, including an ABG machine, bedside X-rays, ECHO, ultrasound, and continuous monitoring facilities. Investigations and treatments followed NICU protocols, and neonates were monitored until discharge or death, with all outcomes recorded.

Scoring Systems: SNAPPE-II and PRISM scores were used to assess the severity of the neonates' conditions. The SNAPPE-II score was calculated within 12 hours of admission based on physiological and clinical parameters, including blood pressure, temperature, pH, oxygen levels, and birth weight. PRISM scores were based on cardiovascular, neurological, and laboratory findings, which included mental status assessment, pupillary response, acid-base balance, and hematological values. These scores helped track the neonates' conditions, guiding treatment and predicting outcomes.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 20.0. Continuous variables were compared using the Mann-Whitney test, while categorical variables were analyzed using the Chi-square test. To predict mortality, the SNAPPE-II score's ability was assessed using a ROC curve. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated, with a p-value below 0.05 considered statistically significant.

RESULTS

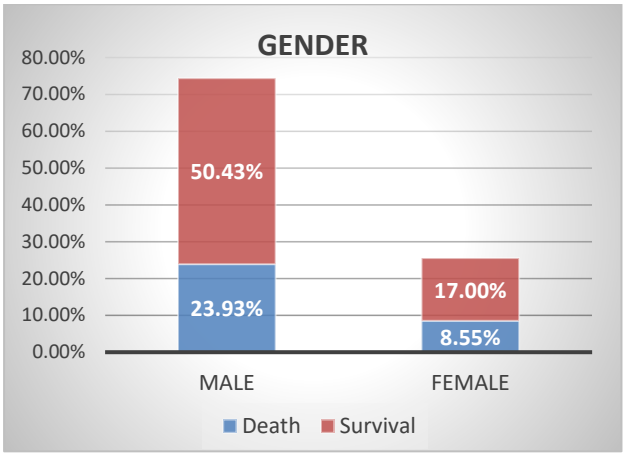
The study focused on 117 neonates, consisting of 87 males (74.36%) and 30 females (25.64%). The overall survival rate was 67.52% while the death rate stood at 32.48%. [Graph 1]

Among the neonates, 64.10% cried immediately after birth, while 35.90% did not. Additionally, 75.21% of the newborns did not require resuscitation, whereas 24.79% did. Most babies (95.73%) had no congenital anomalies.

Data on medical history, cardiovascular and neurological status, acid-base blood gases, biochemistry, and hematology were collected at admission and 24 hours later. Parameters such as mean BP, lowest temperature, lowest serum pH and urine output showed minimum

significant differences between admission and 24 hours. However, the mean pO_2/FiO_2 ratio was significantly different between these two times. Multiple seizures showed a slight increase in occurrence from admission to 24 hours.

Mean temperature showed a significant difference between admission and 24 hours. Pupillary response data indicated a decrease in "Both Fixed" from 8.55% at admission to 0% at 24 hours, with "Both Reactive" increasing from 90.60% at admission to 91.45% at 24 hours. In acid-base blood gases, PCO2, total CO2 as well as PaCO2 levels changed slightly over time, but mean pH was significantly different. The incidence of acidosis was higher at admission (38.46%) compared to 24 hours (14.53%), with "No" for acidosis being more prevalent at 24 hours (85.47%) than at admission (61.54%). Biochemical parameters, including potassium, creatinine, and BUN, showed no significant differences between admission and 24 hours, and glucose levels remained stable. Hematological tests, including white cell count, platelet count, PT, and PTT, also showed no significant differences over time. {Table 1]

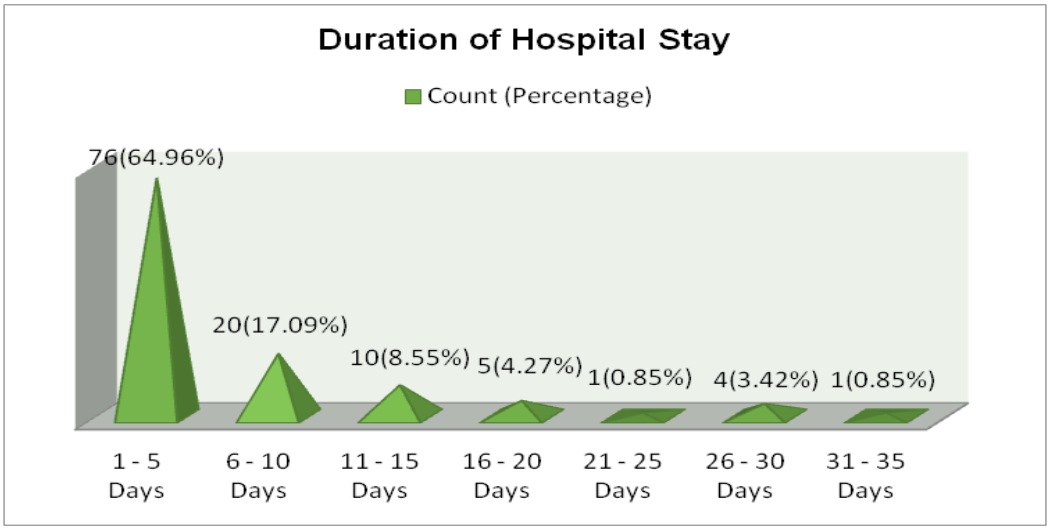


Graph 1: Association between gender and outcome of survival and death of neonates

Table 1. Data on cardiovascular and neurological status, pupillary response, acid-base blood gases, biochemistry and hematology

Cardiovascular & Neurology	**(N=117)**	**(Min-Max)**	**(Mean ± SD)**	**P value**
Mean blood pressure (mm Hg)	At the time of admission	(14.00-44.00)	(30.62 ± 5.44)	0.08375
	24 Hours	(0.00-44.00)	(30.19 ± 6.26)	
Lowest Temperature(F)	At the time of admission	(94.30-99.90)	(97.29 ± 1.13)	0.3361
	24 Hours	(94.30-99.90)	(97.26 ± 1.15)	
pO_2/FiO_2 Ratio	At the time of admission	(0.25-6.00)	(2.46 ± 1.62)	0.0001038
	24 Hours	(0.18-4.10)	(2.11 ± 1.06)	
Lowest Serum Ph	At the time of admission	(6.83-7.46)	(7.32 ± 0.11)	0.8074
	24 Hours	(6.90-7.60)	(7.32 ± 0.11)	
Urine Output (ml/kg/hr)	At the time of admission	(0.10-2.00)	(1.15 ± 0.31)	0.1075
	24 Hours	(0.10-1.90)	(1.14 ± 0.31)	
Pupillary response (N=117)		**Both**	**Both Fixed**	**Reactive**
	At the time of admission	1 (0.85%)	10 (8.55%)	106 (90.60%)
	24 Hours	0 (0%)	10 (8.55%)	107 (91.45%)
Acid base blood Gases	(N=117)	**(Min-Max)**	**(Mean ± SD)**	**P value**
PH	At the time of admission	(6.50 – 7.46)	(7.26 ± 0.17)	0.001
	24 Hours	(6.80 – 7.51)	(7.31± 0.12)	
PCO_2(mmHg)	At the time of admission	(16.0 – 132.0)	(55.6 ± 22.30)	NA
	24 Hours	(16.0 – 132.0)	(55.6 ±22.30)	
Total CO_2 (mEq/L)	At the time of admission	(26.00 – 46.00)	(34.48 ± 4.10)	NA
	24 Hours	(26.00 - 46.00)	(34.48 ± 4.10)	
$PaCO_2$(mmHg)	At the time of admission	(16.00 – 132.00)	(55.23 ± 22.27)	NA
	24 Hours	(16.00 – 132.00)	(55.23 ± 22.27)	
Biochemistry	(N=117)	**(Min-Max)**	**(Mean ± SD)**	**P value**
GLUCOSE (mg/dl)	At the time of admission	(5.00 – 342.00)	(68.32 ± 44.77)	NA
	24 Hours	(5.00 – 342.00)	(68.32 ± 44.77)	
POTASSIUM (mEq/L)	At the time of admission	(0.58 – 6.30)	(5.12 ± 0.86)	0.6717
	24 Hours	(3.20 – 6.20)	(5.16 ± 0.68)	
CREATININE (mg/dl)	At the time of admission	(0.31 – 6.38)	(0.97 ± 0.69)	0.3703
	24 Hours	(0.37 – 5.16)	(0.92 ± 0.56)	
BUN (mg/dl)	At the time of admission	(1.50 – 75.00)	(19.24 ± 12.00)	0.6248
	24 Hours	(8.00 – 70.30)	(19.89 ± 11.42)	
Haematological test	(N=117)	**(Min-Max)**	**(Mean ± SD)**	**P value**
White cell count (microliter)	At the time of admission	(1190 - 45300)	(14160 + 8589.28)	0.2882
	24 Hours	(1100 - 228000)	(16433 + 24533.67)	
Platelet count (microliter)	At the time of admission	(10.0 – 568.0)	(210.2 + 108.35)	0.7476
	24 Hours	(20.0 - 611.0)	(206.4 + 107.49)	
PT and PTT (seconds)	At the time of admission	(10.80 – 72.40)	(23.55 + 10.47)	0.1451
	24 Hours	(10.80 – 62.40)	(21.71 + 7.99)	

Hospital stay duration was highest for the "1-5 Days" group (64.96%), followed by "6-10 Days" (17.09%), "11-15 Days" (8.55%), "16-20 Days" (4.27%), and "26-30 Days" (3.42%). [Graph 2]



Graph 2: Duration of Hospital Stay for Neonates

The mean SNAPPE II score at admission and 24 hours was higher for mortality than for survival. SNAPPE II scores at admission and 24 hours with a cutoff of 30 were associated with outcomes, and the sensitivity values were 81.58% at admission and 73.68% at 24 hours. This indicates that the SNAPPE II score at admission better predicted mortality than the score at 24 hours.

The SNAPPE II score showed strong predictive ability, with ROC curve areas of 0.88 at admission and 0.81 at 24 hours.

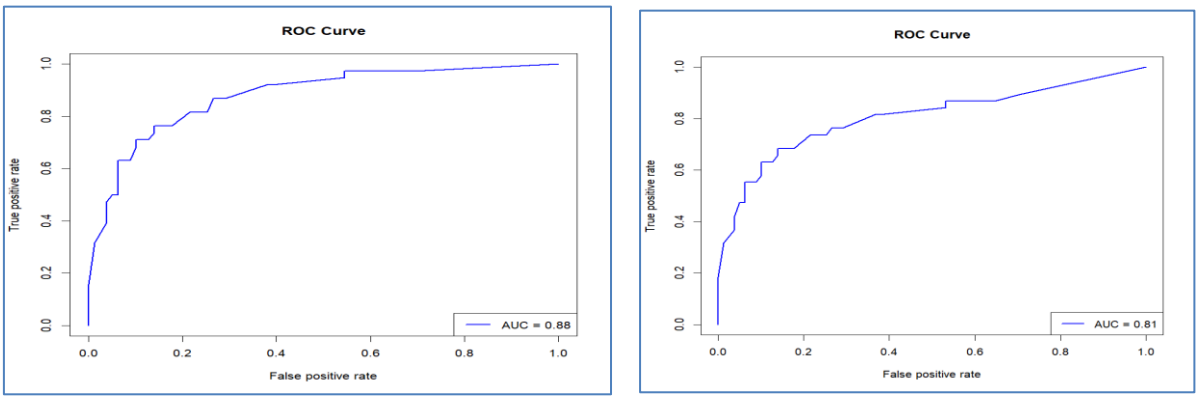
The optimal cut-off for predicting mortality was 30, which resulted in a sensitivity of 81.58%, specificity of 78.48%, positive predictive value (PPV) of 64.58%, negative predictive value (NPV) of 89.85%, and diagnostic accuracy of 26.50% at admission. In contrast, at 24 hours, the sensitivity was 73.68%, specificity remained at 78.48%, PPV was 62.22%, NPV was 86.11%, and overall accuracy was 23.93%. [Table 3, Graph 3]

Table 2: SNAPPE II score for mortality at the time of admission and 24 hr

SNAPPE II score at the time of admission	Death (n=38)	Survival (n=79)	SNAPPE II score 24 Hours	Death (n=38)	Survival (n=79)
0-10 (n =32)	1	31	0-10 (n =36)	5	31
10-20 (n =19)	2	17	10-20 (n =20)	2	18
20-30 (n =18)	4	14	20-30 (n =16)	3	13
30-40 (n =13)	4	9	30-40 (n =13)	4	9
40-50 (n =11)	8	3	40-50 (n =9)	6	3
50-60 (n =11)	7	4	50-60 (n =10)	6	4
60-70 (n=9)	8	1	60-70 (n=8)	7	1
70-80 (n=1)	1	0	70-80 (n=2)	2	0
80-90 (n=3)	3	0	80-90 (n=3)	3	0
Mean SNAPPE II score	48.97 ± 19.65	17.55 ± 16.59	**Mean SNAPPE II score**	44.42 ± 24.64	17.49 + 16.53
P-value	2.721e-11	**P-value**	7.862e-08		

Table 3: SNAPPE II score for mortality cut-off score, Positive Predictive Value (PPV), Negative Predictive Value (NPV)

		Outcome							
SNAPPE II score	**Cut off**	**Death (%)**	**Survival (%)**	**P value**	**Sensitivity**	**Specificity**	**PPV**	**NPV**	**Diagnostic Accuracy**
At the time of admission	**≥30**	31 (81.6%)	17 (21.5%)	<0.05* Sig	81.58%	78.48%	64.58%	89.55%	26.50%
	<30	7 (18.4%)	62 (78.5%)						
24 Hours	**≥30**	28 (73.6%)	17 (21.5%)	<0.05* Sig	73.68%	78.48%	62.22%	86.11%	23.93%
	<30	10 (26.4%)	62 (78.5%)						



a. At the time of admission b. At 24 hours

Graph 3: ROC curve for SNAPPE II score

In this study, higher mean PRISM III scores were observed at admission and 24 hours for neonates who did not survive compared to those who did. Using a cutoff of 20, PRISM III scores at admission showed a sensitivity of 78.94%, while at 24 hours it was 68.42%. This suggests that PRISM III scores at admission are more effective in predicting mortality compared to scores at 24 hours. [Table 4]

The PRISM III score showed strong predictive ability, with ROC curve areas of 0.87 at admission and 0.85 at 24 hours. The optimal cut-off for predicting mortality was 20, which resulted in a sensitivity of 78.94%, specificity of 96.20%, positive predictive value (PPV) of 90.90%, negative predictive value (NPV) of 90.48%, and diagnostic accuracy of 25.64% at admission. In contrast, at 24 hours, the sensitivity was 68.42%, specificity remained at 96.20%, PPV was 89.66%, NPV was 86.36%, and overall accuracy was 22.22%. [Table 5; Graph 4]

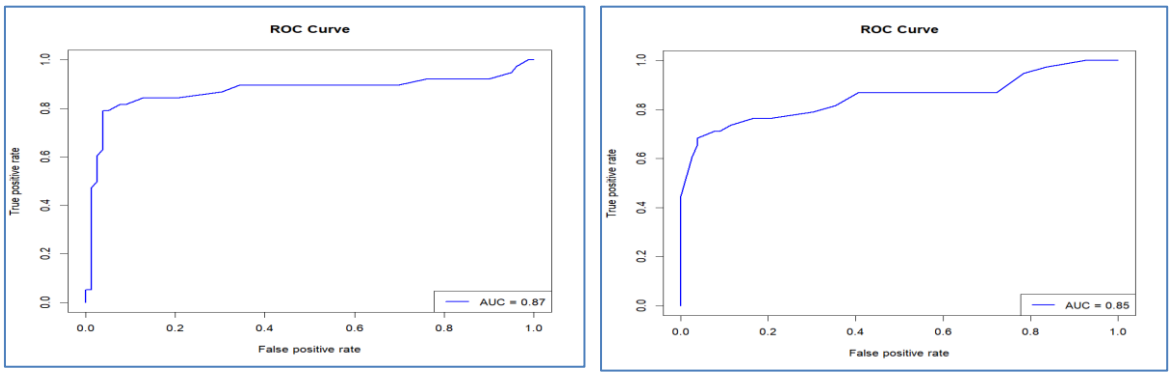
When SNAPPE II and PRISM III scores were compared at a 24-hous, SNAPPE II sensitivity was 73.68%, while PRISM III sensitivity was 68.42%. The results of the study showed that, in comparison to the PRISM III score at 24 hours, the SNAPPE II score at 24 hours had superior prediction potential for death. After 24 hours, the area under the curve (AUC) for SNAPPE II was 81%, and for PRISM III, it was 85%. {Table 6]

Table 4: PRISM III score for mortality at the time of admission and 24 hr

PRISM III score at the time of admission	Death (n=38)	Survival (n=79)	PRISM III score 24 Hours	Death (n=38)	Survival (n=79)
0-10 (n =43)	4	39	0-10 (n =38)	5	33
10-20 (n =41)	4	37	10-20 (n =50)	7	43
20-30 (n =16)	14	2	20-30 (n =19)	16	3
30-40 (n =12)	12	0	30-40 (n =6)	6	0
40-50 (n =4)	3	1	40-50 (n =3)	3	0
50-60 (n =1)	1	0	50-60 (n =1)	1	0
60-70 (n=0)	0	0	60-70 (n=0)	0	0
70-80 (n=0)	0	0	70-80 (n=0)	0	0
80-90 (n=0)	0	0	80-90 (n=0)	0	0
Mean PRISM III score	26.55 ± 11.19	10.70 ± 6.01	**Mean PRISM III score**	23.89 + 11.10	11.67 + 4.45
P-value	8.865e-11	**P-value**	**<0.05* Sig**		

Table 5: PRISM III score for mortality cut-off score, Positive Predictive Value (PPV), Negative Predictive Value (NPV)

		Outcome							
PRISM III score	**Cut off**	**Death (%)**	**Survival (%)**	**P value**	**Sensitivity**	**Specificity**	**PPV**	**NPV**	**Accuracy**
At the time of admission	**≥20**	30 (78.9%)	3 (7.9%)	**<0.05* Sig**	78.94%	96.20%	90.90%	90.48%	25.64%
	<20	8 (21.1%)	76 (92.1%)						
24 Hours	**≥30**	26 (68.4%)	3 (7.9%)	**<0.05* Sig**	68.42%	96.20%	89.66%	86.36%	22.22%
	<30	12 (31.6%)	76 (92.1%)						



a. At the time of admission b. At 24 hours

Graph 4: ROC curve for PRISM III score

Table 6: Sensitivity and specificity values for SNAPPE II 24 hr and PRISM III 24 hr

Final diagnosis	SNAPPE II 24 Hours	PRISM III score 24 Hours
Sensitivity	73.68%	68.42%
Specificity	78.48%	96.20%
Positive Predictive Value (PPV)	62.22%	89.66%
Negative Predictive Value (NPV)	86.11%	86.36%
Diagnostic Accuracy	23.93%	22.22%

The findings reveal that the SNAPPE II score at admission is more effective in predicting neonatal mortality than the 24-hour score. Although the PRISM III score also predicts mortality, it has lower sensitivity compared to SNAPPE II. The Hosmer and Lemeshow goodness-of-fit test showed no significant differences between observed and predicted values for the SNAPPE II score at admission and 24 hours, as well as for the PRISM III score at admission. However, there was a significant disparity for the PRISM III score at 24 hours, indicating potential limitations in its predictive accuracy at that time.

DISCUSSION

The study compares the PRISM-III and SNAPPE-II scores in assessing neonatal mortality risk in a cohort of 117 neonates (74.36% male and 25.64% female) in a neonatal ICU. Among the participants, 64.10% cried after birth, and 75.21% did not require resuscitation, with 95.73% having no congenital anomalies. Data on medical history, neurological status, and laboratory results were collected at admission and 24 hours later. While most clinical parameters showed minimal differences over time, the mean pO2/FiO2 ratio was significantly altered, and there was a notable decrease in acidosis incidence from 38.46% at admission to 14.53% at 24 hours.

The average duration of hospital stay was predominantly 1-5 days (64.96%), with an overall survival rate of 67.52% and a mortality rate of 32.48%. The SNAPPE II score demonstrated a higher mean for non-survivors at both admission and 24 hours, with sensitivity values of 81.58% at admission and 73.68% at 24 hours, indicating better predictive ability for mortality at admission. The study highlights the efficacy of SNAPPE II over PRISM III in predicting neonatal outcomes within the first 24 hours of admission.

Mia RA et al.[21] reported concurrent findings with an average SNAPPE II score ranging from 0 to 81, with a mean of 26.3 ± 19.84. Non-survivors had significantly higher scores (42.75 ± 18.59) than survivors (17.4 ± 14.05). The SNAPPE II score demonstrated strong predictive ability for mortality, with ROC areas of 0.863 for overall mortality and 0.889 for the first six days. An optimal cut-off score of 30 yielded a sensitivity of 81.8%, specificity of 76.9%, PPV of 60.0%, and NPV of 90.0%.

Niranjan HS et al.[22] also found a significant link between higher SNAPPE II scores and mortality, with average scores of 45.7 ± 18.689 for deceased neonates compared to 21.04 ± 15.418 for survivors. Their study showed a sensitivity of 76.9%, specificity of 87.1%, NPV of 52.6%, and PPV of 95.3%. A cut-off score of 37 indicated that neonates above this threshold had higher mortality rates (30 out of 39) compared to those below (9 out of 66). These findings confirm SNAPPE II's effectiveness in assessing illness severity and predicting outcomes in NICUs.

The study indicated that higher mean PRISM III scores at both admission and 24 hours were linked to higher mortality rates among neonates. With a cutoff score of 20, the sensitivity for predicting mortality was 78.94% at admission and 68.42% at 24 hours, suggesting that admission scores were more predictive. This aligns with Bilan N et al. [23], who found the PRISM-III scoring system to have strong predictive accuracy (AUC of 0.898) and good calibration (p = 0.161) with an observed-to-expected mortality ratio of 1.005.

In a separate study, Volakli E et al.[24] reported a mean PRISM score of 8.97 ± 7.79 in their cohort, showing no significant differences between observed and predicted values for SNAPPE II at admission and 24 hours, or for PRISM III at admission. However, a significant difference was noted for the PRISM III score at 24 hours, indicating limitations in its predictive accuracy at that time.

The comparison of SNAPPE II and PRISM III scores at 24 hours revealed that SNAPPE II had a sensitivity of 73.68%, while PRISM III showed a sensitivity of 68.42%, indicating SNAPPE II's superior predictive ability for mortality. The area under the curve (AUC) was 81% for SNAPPE II and 85% for PRISM III.

Supporting these findings, Tyagi et al. reported good calibration for both scores, with Chi-square values of 7.252 (PRISM III) and 5.412 (SNAPPE II) and p-values of 0.510 and 0.610, respectively. Similar results were found by other studies, including Volakali E et al. [24], Varma A et al. [25], and Bilan N et al. [23], indicating that PRISM scores are effective for mortality prediction. Moreover, Richardson DK et al.[5] and Timothy J et al. [26] reported strong goodness-of-fit p-values for SNAPPE II. However, none of these studies directly compared the sensitivity, specificity, and diagnostic accuracy of SNAPPE II and PRISM III scores.

CONCLUSION

The study concludes that the SNAPPE II score at 24 hours post-admission is more effective in predicting neonatal mortality than the PRISM III score at the same time point, as indicated by its higher sensitivity values. This sensitivity suggests that SNAPPE II is better at identifying at-risk patients who may not survive. The area under the ROC curve (AUC) for SNAPPE II at 24 hours was 81%, while PRISM III had an AUC of 85%, reflecting slightly higher discriminatory power.

Despite this, sensitivity remains a critical factor in clinical settings where early identification of high-risk neonates is essential for timely interventions. The SNAPPE II score's emphasis on physiological parameters may also offer practical advantages in neonatal intensive care, where such data is readily available.

In summary, while both scoring systems are valuable for assessing neonatal risk, SNAPPE II's superior sensitivity at 24 hours makes it a potentially more reliable tool for early risk stratification and intervention planning, highlighting the need to choose the appropriate scoring system based on the specific needs of the patient population and clinical environment.

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