e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2023; 15(4); 932-944

Original Research Article

Study and Compare the Efficacy of Rapid Emergency Medicine Score (REMS) and National Early Warning Score (NEWS) in Prediction of Hospital Outcomes in Patients of Sepsis

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Received: 09-02-2023 / Revised: 11-03-2023 / Accepted: 04-04-2023

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Conflict of interest: Nil

Abstract

Background: Sepsis is the leading cause of death worldwide in critically ill patients. To predict the outcome, an early diagnosis and stratification of the severity of sepsis is important. Efficient scoring methods for early diagnosis, stratification of severity and prognostication of sepsis are critical specially in resource limited settings. Clinical scoring systems are cost effective methods which can ensure rapid identification of patients requiring critical care.

Aim: The present study was done to compare the efficacy of two clinical scoring system, REMS, and NEWS in prediction of hospital outcomes in sepsis patients.

Materials & Methods: 100 patients of sepsis who were diagnosed on basis of qSOFA score, who fulfilled inclusion and exclusion criteria were selected for the study after taking informed consent. After admission in ER, detailed clinical history and examination was done. NEWS and REMS was calculated within 30 mins of admission in ER. All Collected data was analyzed and studied accordingly.

Results: Among 100 patients of sepsis mean age of patients was found to be 55 years and among them 40% were female and 60% were male. Most common focus of sepsis was respiratory infections and most common isolated organism was Escherichia coli. On comparing, REMS and NEWS score in prognostication of hospital outcomes of the patients, it was documented that the p value was significant for both the scores to assess the outcome in patients of sepsis ($p<0.05$). However, ROC was plotted and REMS was found to be superior to NEWS.

Conclusion: The study concludes that there is significant association between the outcome of sepsis patients with the REMS and NEWS scores. The study found REMS and NEWS scoring as important predictors for the mortality among the patients admitted with sepsis. REMS was found to be superior to NEWS scoring in predicting the worst outcome among the study subjects.

Keywords: NEWS, REMS, ER, qSOFA score, Sepsi.

Introduction

Sepsis is a life-threatening organ dysfunction caused by exaggerated response to our immune system to an infection and septic shock is a situation where there is profound circulatory failure in the form of decrease in vascular tone with some degree of hypovolemia and is associated with a greater risk of mortality.[1] In sepsis, complex chain of events occurs involving inflammatory and anti-inflammatory processes, humoral and cellular reactions, and circulatory abnormalities.[2,3] The understanding of sepsis has evolved from an inflammatory response syndrome caused by infection (sepsis 1.0) to an inflammatory response syndrome with organ dysfunction (sepsis 2.0) to a life-threatening organ disorder caused by the body's uncontrolled response to infection (sepsis 3.0).[4,5].

Sepsis is the leading cause of death worldwide in critically ill patients in spite of modern antibiotics and resuscitation measures.[6,7] To predict the outcome, an early diagnosis and stratification of the severity of sepsis is important.[8,9] The magnitude of mortality in sepsis is high in low-income countries due to lack of essential drugs, understaffed and underfunded health care systems.[10] Hence, it becomes important in identifying sepsis and predict the likely outcome at the earliest to prioritize available resources. Predictive mortality scores permit the identification of patients requiring special attention on admission.[11,12] In Indian population, study has documented the sepsis prevalence on the study day was 382 of 677 patients (56.4%). Prevalence by Sepsis-3 and Sepsis-2 definitions was 33.2% and 46.2%, respectively, with minimal concordance.[13]

Early recognition of patients with sepsis is the key to improve its management, especially in those with greater severity who are at risk of adverse outcomes. There are available plenty of biomarkers available to diagnose and monitor the progression of sepsis. However, developing early warning score [14] tools to identify those patients early may aid clinicians to accelerate treatment and could lead to improved outcomes.

Risk stratification scores have been developed for many groups of patients such as those with trauma, critical illness and for acute coronary syndrome. These have played a crucial role in improving the care by providing the risk adjusted estimates of the mortality and morbidity. The emergency medical admission plays an important role and takes a significant proportion of workload at emergency department. The mortality among these patients is significantly high and thus determining the quality of care for the patients influences the outcome of disease. Hence there is requirement of risk stratification score at emergency medicine allowing to estimate the risk of mortality and morbidity.

For predicting the outcome of sepsis at the earliest many scoring systems like SOFA, APACHE 2, REMS, MPM have been developed.[12] However, the use of certain scores like SOFA and APACHE 2 requires more laboratory parameters such as Arterial Blood Gas (ABG) analysis, serum bilirubin, serum creatinine, total platelet counts repeatedly, which are not possible in resource poor hospitals. The organ dysfunction due to sepsis is manifested as acute rise in 2 points in qSOFA score from baseline and is assessed by 1) SBP <= 100 mm of HG; 2) RR >=22/min; 3) altered

mentation. Resource limited settings need simple and cost-effective clinical scores which can ensure rapid identification of patients requiring critical care.[15]

Rapid Emergency Medicine Score (REMS) score comprises simple variables like, age in years, PR, RR, MAP, GCS and SpO2 estimation.[16] It is a simple and feasible scoring system. The higher the REMS score, poor is the prognosis. REMS scoring system has been validated on European patients in modern hospital environment. In few validation studies, REMS at cut-off score of 6-7 was found to be better in predicting in-hospital mortality in emergency department patients with area under receiver operating curve being significant for REMS. REMS was found to have the same predictive accuracy as APACHE 2 score.[17].

The National Early Warning Score (NEWS) is simple scoring system in which a score is allocated to physiological measurements like RR, SpO2, temperature, SBP, PR, level of consciousness. It was developed to asses and monitor hospitalized patients for early detection of clinical deterioration. Despite developed for clinical deterioration, it has been validated as a feasible predictor for adverse outcome due to sepsis. NEWS has a higher accuracy than qSOFA and SIRS for predicting mortality in non-surgical ED patients.[18]

In our study we aimed to study and compare the efficacy of REMS and NEWS in prediction of hospital outcomes in patients of sepsis.

SIRS

SIRS includes 2 or more of the following:

- Heart rate > 90 beats per minute.
- Temperature > 38º C or < 36º C.
- Tachypnea greater than 20 breaths per minute or PaCO2 less than 32 mm Hg.
- White blood cell (WBC) count > 12,000 per cubic millimetre or < 4000 per cubic millimetre, or > 10% immature (band) forms.[19]

SEPSIS

- SIRS plus infection source causing it.

Severe Sepsis

- Sepsis associated with organ dysfunction (1 or more), hypo-perfusion abnormality, or sepsis-induced hypotension.
- Hypo-perfusion abnormalities may include but are not limited to lactic acidosis, oliguria, or acute change in mental status.

Septic Shock

- Sepsis-induced hypotension despite adequate fluid resuscitation.

The presence of altered organ function in an acutely unwell patient such that homeostasis cannot be maintained without intervention is referred to as multi-organ dysfunction syndrome (MODS).

Sepsis-3 defines sepsis as a potentially fatal organ malfunction produced by an unbalanced host response to infection. It is crucial to emphasise that not all patients with SIRS have an infection, and not all patients with an infection are septic. A dysregulated host response and the presence of end-organ failure distinguish sepsis from infection.[5] Sepsis and its consequences have a wide range of clinical and pathophysiologic severity, culminating in the gradual physiologic collapse of several interrelated organ systems.[20,21]

Risk factors that predispose to sepsis are Diabetes, Malignancy, Burns, Liver disease, Chronic kidney disease, Use of corticosteroids Immunosuppressed state, Major surgery, Trauma, Prolonged hospitalization, Elderly patients, Hemodialysis etc

Sepsis is a clinical illness that proceeds on a pathophysiologic continuum, starting with a systemic inflammatory response syndrome (SIRS) and ending with

multiorgan dysfunction syndrome (MODS) before death.

Following that, sepsis is defined clinically as a systemic inflammatory response syndrome caused by an infectious agent. With the beginning of hypotension, tissue oxygenation fails to meet tissue demands, and the patient is now defined as having severe sepsis.[20]

With the onset of hypotension, tissue demands are insufficiently supplied by tissue oxygenation, and the patient is now classified as having severe sepsis. The decrease in peripheral arterial perfusion and oxygenation causes cellular and metabolic disruptions, most notably a change from aerobic to anaerobic respiration and lactic acidosis. Signs of end-organ injury, such as pre-renal azotemia or transaminitis, can also indicate tissue hypoperfusion. During resuscitation, the difference in oxygen supply and demand can be monitored by trending the mixed venous oxygen saturation from a central line in the superior vena cava (SVC), if one is available.[22,23]

Septic shock differs from other shock states in that it is a distributive form of shock. A mixture of inflammatory mediators (histamine, serotonin, super-radicals, lysosomal enzymes) produced in response to bacterial endotoxins increases capillary permeability while decreasing peripheral vascular resistance. This results in a decrease in not just after load but also in preload due to a decrease in venous return from third-spacing. The consequent drop in stroke volume is first accommodated by an increase in heart rate, i.e., compensated septic shock. As a result, the patient is in the hyperdynamic condition associated with septic shock.

Septic shock is defined functionally as prolonged hypotension despite sufficient fluid resuscitation of 60 mL/kg to 80 mL/kg of crystalloid or colloid fluid. At this stage, starting adequate vasoactive medicines like beta-adrenergic or alpha-adrenergic agents is critical.[24,25] The development of organ dysfunction despite high-dose vasoactive treatment characterises the condition known as multi-organ dysfunction syndrome (MODS), which has a death rate of up to 75%. While determining the precise circumstances indicating poor prognosis and mortality has proven challenging, immunologic dissonance (exaggerated pro-inflammatory response) vs immunologic paralysis (exaggerated anti-inflammatory response) has been proposed to play a role.[2]

Patients who suffer septic shock will have severe sepsis symptoms such as hypotension. Notably, blood pressure may be maintained at an early "compensated" stage of shock, and other signs of distributive shock, such as warm extremities, fast capillary refill (less than one second), and bounding pulses, are common. This stage of shock can be reversed if treated quickly with fluid resuscitation and vasoactive support. Hypotension develops when septic shock progresses into the uncompensated stage, and patients may appear with chilled extremities, delayed capillary refill (greater than three seconds), and thready pulses, sometimes known as cold shock. With persistent tissue hypoperfusion, shock may become irreversible, swiftly progressing into multiorgan failure syndrome and death.[22]

Patients should be placed on continuous cardiopulmonary monitoring so that vital signs may be closely monitored. End-organ function and peripheral perfusion should be thoroughly evaluated to see where they may lie on the pathophysiologic continuum of sepsis. A Glasgow Coma Scale (GCS) or mental state evaluation, urine output measurement, or lactate/mixed venous saturation test should all be included (with central lines) An x-ray of the chest may reveal symptoms of pneumonia or ARDS. If the patient develops necrotizing fasciitis, plain x-rays of the extremities may indicate the presence of gas in the tissues. The gallbladder may be evaluated using

ultrasound. A CT scan is performed to look for abscesses, intestinal perforation, or ischemia in the belly.[22]

Complications include acute or chronic renal injury, Acute liver failure, ARDS, DIC, Myocardial dysfunction etc.

Scoring System and its Evolution

qSOFA

The qSOFA score (also known as quick SOFA) is a bedside prompt that may identify patients with suspected infection who are at greater risk for a poor outcome outside the intensive care unit (ICU). It uses three criteria, assigning one point for low blood pressure (SBP≤100 mmHg), high respiratory rate (≥22 breaths per min), or altered mentation (Glasgow coma scale<15). The score ranges from 0 to 3 points. The presence of 2 or more qSOFA points near the onset of infection was associated with a greater risk of death or prolonged intensive care unit stay. In our study we have selected patients with qSOFA score of ≥2.

National Early Warning Score (NEWS)

The National Early Warning Score (NEWS) was first introduced by the Royal College of Physicians in 2012 as a predictor of patient deterioration. However, it was not specifically designed for septic patients. It includes seven parameters (temperature, systolic blood pressure, respiratory rate, oxygen saturation, oxygen supply, heart rate, and level of consciousness) as shown in the table. The score range is from 0 to 20. Patients are classified as a low score (NEWS 1–4), medium score (NEWS of 5–6) and high score (NEWS≥7)(11). NEWS is a sensitive screening tool in the ED for predicting sepsis-related outcomes.[26]

Table 1 National Early Warning Score (NEWS)

Physiological Parameters	3	2	1	0	1	2	3
Respiration Rate (BPM)	≤8		9–11	12–20		21–24	≥25
Oxygen Saturation (%)	≤91	92–93	94–95	≥96			
Any Supplemental Oxygen		Yes		No			
Temperature	≤35		35.1–36.0	36.1–38.0	38.1–39.0	≥39.1	
Systolic Blood Pressure (mmHg)	≤90	19–100	101–110	111–219			≥220
Heart Rate (BPM)	≤40		41–50	51–90	91–110	111–130	≥131
Level of Consciousness				Alert			U, P or V*

Note: *Unresponsive, react to pain, or loud voice.

Rapid Emergency Medicine Score (REMS)

The Rapid Emergency Medicine Score (REMS), an attenuated version of APACHE II, allows for prompt calculation. REMS is a composite score consisting of the GCS, RR, oxygen saturation, MAP, hazard ratio and age. Among non-surgical patients who present to the ED, REMS has proven to be a valid predictor of mortality.[27]

Table 1 REMS scoring system

	Score						
Variable	0	+1	+2	+3	+4	+5	+6
Age (years)	<45		45–54	55–64		65–74	>74
MAP (mm Hg)	70–109		110–129	130–159	>159		
			50–69		≤49		
Heart rate (bpm)	70–109		110–139	140–179	>179		
			55–69	40–54	≤39		
RR (breaths/min)	12–24	25–34	6–9	35–49	>49		
		10–11			≤5		
O_2 saturation (%)	>89	86–89		75–85	<75		
GCS	14 or 15	11–13	8–10	5–7	3 or 4		

GCS, Glasgow Coma Scale; MAP, mean arterial pressure; REMS, Rapid Emergency Medicine Score; RR, respiratory rate.

Implication:

This study was done to understand the efficacy between REMS and NEWS in predicting the outcomes of patients of sepsis admitted in ED, thus helps in early identification and treatment of the patient for better outcomes.

Methodology

Study Design: Hospital Based Prospective observational study with a sample size of 100. REMS and NEWS was calculated within 30 mins of admission in ED.

Study Duration: 12 months

Inclusion Criteria: All the non-surgical patients above age of 18 years having signs and symptoms of infection with qSOFA score >=2 was included in the study.

Exclusion Criteria: Patients less than 18 years of age or the patients needing surgical interventions or patients with any sort of trauma.

Case Selection: Patients in ED diagnosed with sepsis (using qSOFA score and clinical suspicion) and willing to participate in the study were enrolled. After admission in ED, detailed clinical history and examination was done including all the parameters required for the scoring system. Course of patient after admission were followed and outcomes were noted and then correlated. NEWS and REMS was calculated within 30 mins of admission in ER. Routine and required investigations were done.

Statistical analysis

Data collected were tabulated in the Microsoft excel and summarized as mean, standard deviation, frequency, and percentage. The mean difference between the continuous variable were analyzed unpaired t-test and paired variable using paired t-test. The ROC analysis was performed to predict the outcome using the different scoring system. A p-value of <0.05 was considered statistically significant. Collected data was analysed and studied accordingly using SPSS v21 software.

Results

In present study total of 100 patients fulfilling inclusion criteria were included with mean age of 55.02±14.5yrs of age. Among them 40% were female patients and 60% were male patients.

Table 1: Showing the mean age levels among the study participants

	N	Minimum	Maximum	Mean	SD
Age in years	100	19	95	55.02	14.50

Among the participants, 60% were male and 40% were female patients.

Table 2: Number of patients with comorbid conditions.

		Frequency	Percent
Diabetes Mellitus	No	64	64.0
	Yes	36	36.0
Hypertension	No	56	56.0
	Yes	44	44.0
Diabetes mellitus with Hypertension	No	76	76.0
	Yes	24	24.0

Diabetes mellitus was present in 36% of the patients, hypertension was present in 44% of the patients and both diabetes and hypertension were present in 24% of the patients.

Table 3: Focus of sepsis among study subjects

		Frequency	Percent
Focus of sepsis	Abdominal	28	28.0
	CNS	1	1.0
	Genitourinary	24	24.0
	Respiratory	38	38.0
	Unknown	9	9.0
	Total	100	100.0

Focus of sepsis was majorly respiratory infections which was seen in 38% of the patients, followed with abdominal infections in 28% of the patients and 24% patients of had genitourinary infections and 1 % of patient had CNS infections. In 9% of the patients focus of the sepsis was unknown as the culture was sterile.

Table 4: Isolated organism among study participants

		Frequency	Percent
Isolated Organism	No growth	9	9.0
	Acinetobacter Baumanii	5	5.0
	Burkholderia Cepacia	1	1.0
	Candida Albicans	2	2.0
	Enterococcus	7	7.0
	Escherichia Coli	21	21.0
	Klebsiella Pneumoniae	15	15.0
	Methicillin Resistant Staphylococcus Aureus	18	18.0
	Morganella Morganii	1	1.0
	Pseudomonas Aeruginosa	9	9.0
	Staphylococcus Aureus	11	11.0
	Stenotrophomonas Maltophilia	1	1.0
	Total	100	100.0

On isolation of the organism, study documented the most common organism was Escherichia Coli in 21% of the patients, followed with 18% of the patients with MRSA, 15% of the patients with Klebsiella pneumoniae, 11% of the patients with *Staphylococcus aureus* and 9% of the patients with *Pseudomonas aeruginosa*, 5% of the patients with Acinetobacter Baumanii, 7% of the patients with Enterococcus, 2% of the patients with Candida Albicans, 1% of the patients with Morganella Morganii and Burkholderia Cepacia. No growth in culture was seen in 9% of the patients.

Table 5: Length of hospital stay among study subjects.

		Frequency	Percent
Length of Hospital stay	<5	1	1.0
	<7	59	59
	>7	38	38.0
	>10	2	2.0
	Total	100	100.0

On assessment of length of hospital stay, study documented 59% of the patients with less than 7 days of hospital stay, followed with 38% of patients with more than 7 days of hospital stay. 2% of the patients had hospital stay of >10 days and 1% of the patients had hospital stay of <5 days.

Table 6: ICU admission among study subjects

		Frequency	Percent
ICU	No	8	8.0
	Yes	92	92.0
	Total	100	100.0

ICU admission was required in 92% of the included patients for their management and care. In 35% of the included patients CPR was given.

Table 7: Showing the outcome of study participants.

		Frequency	Percent
Survivors	No	35	35.0
	Yes	65	65.0
	Total	100	100.0

The present study documented the mortality in 35% of the patients.

Table 8: Comparison of the baseline parameters with outcome of patients

	Survivors				t-value	p-value
	No		Yes			
	Mean	SD	Mean	SD		
Pulse	100.2	25.5	99.7	22.3	0.112	0.911
SBP	101.5	28.8	110.9	27.7	-0.721	0..01*
DBP	60.8	11.4	68.8	15.5	-0.887	0.01*
RR	23.8	6.3	23.0	6.3	0.644	0.521
SPO2	88.8	16.0	94.6	8.2	-2.368	0.02*
TEMP	98.7	.9	98.7	1.2	-0.332	0.741
MAP	64	20	78	19	-0.930	0.05*
GCS	10.2	4.7	12.9	2.5	-0.4275	0.01*

On assessment of the vital parameters between the survivor group, patients with lower SBP, DBP, SPO2, MAP and GCS had poor outcomes like death when compared to the patients who survived.

Table 9: Comparison of the gender, diabetes, hypertension, AVPU, altered mentation with outcome of patients.

		Survivors				Chi-square (p-value)
		No		Yes		
		Count	Column N %	Count	Column N %	
Gender	F	16	45.7%	24	36.9%	0.733 (0.392)
	M	19	54.3%	41	63.1%	
DM	No	18	51.4%	46	70.8%	3.64 (0.05)*
	Yes	17	48.6%	19	29.2%	
HTN	No	18	51.4%	38	58.5%	0.458 (0.499)
	Yes	17	48.6%	27	41.5%	
DM +HTN	No	24	68.6%	52	80.0%	1.629 (0.02)*
	Yes	11	31.4%	13	20.0%	
AVPU	A	18	51.4%	51	78.5%	13.325 (0.01)**
	P	7	20.0%	11	16.9%	
	U	9	25.7%	2	3.1%	
	V	1	2.9%	1	1.5%	
Altered Mentation	N	20	57.1%	42	64.6%	0.539 (0.463)
	Y	15	42.9%	23	35.4%	

On comparison of the various parameters with outcome, patient with DM, HTN and deranged AVPU score had poor outcomes like death as compared to patients who survived.

Table 10: Comparison of the LOS, ICU, hemodialysis, and CPR requirement with outcome of patients

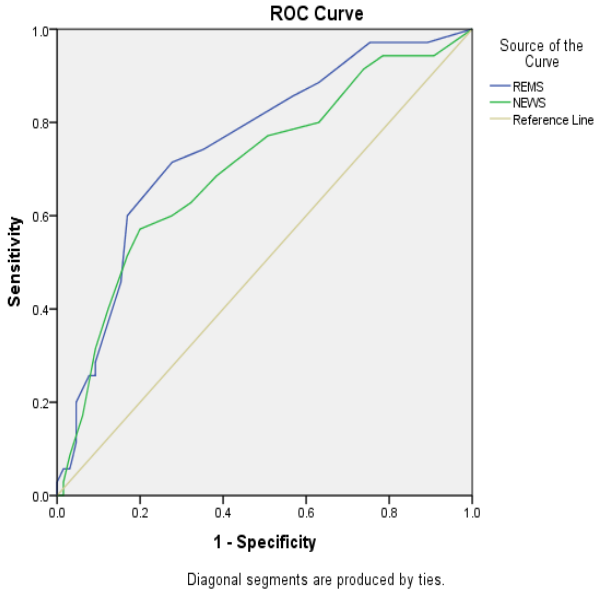
		Survivors				Chi-square (p-value)
		No		Yes		
		Count	Column N %	Count	Column N %	
LOS	<5	0	0.0%	1	1.5%	8.805 (0.06)
	<7	27	77.1%	32	49.2%	
	>7	8	22.9%	30	46.2%	
	>10	0	0.0%	2	3.1%	
ICU	N	0	0.0%	8	12.3%	4.682 (0.03)*
	Y	35	100.0%	57	87.7%	
Dialysis	N	34	97.1%	59	90.8%	1.420 (0.233)
	Y	1	2.9%	6	9.2%	
CPR	N	1	2.9%	64	98.5%	91.40 (0.001)*
	Y	34	97.1%	1	1.5%	

On comparison of various parameters with outcome, patients who required ICU and CPR had poor outcome like death as compared to the patients who survived.

Table 11: Comparison of the predictor mean score with outcome of patients.

	Survivors				t-value	p-value
	No		Yes			
	Mean	SD	Mean	SD		
REMS	8.7	4.4	5.1	3.7	4.231	0.001*
NEWS	8.37	4.31	5.26	3.96	3.630	0.001*

On assessment of the REMS and NEWS score with outcome of the patients, it was documented that the p value was significant for both the scores to assess the outcome in patients of sepsis. ($p<0.05$).



ROC analysis

Table 12: Comparison between REMS and NEWS score

Area Under the Curve					
Test Result Variable(s)	Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
				Lower Bound	Upper Bound
REMS	0.753	0.051	0.000	0.652	0.853
NEWS	0.702	0.056	0.001	0.592	0.813

The ROC analysis showing the predictability of the outcome using the REMS and NEWS scoring system. Study found both are significant in predicting the worst outcome in the patients, between the scores REMS was superior with AUC of 0.753 compared to the NEWS with AUC of 0.703.($p<0.05$).

Table 13: Diagnostic accuracy of REMS score

Statistic For REMS	Value	95% CI
Sensitivity	75.38%	63.13% to 85.23%
Specificity	2.86%	0.07% to 14.92%
Positive Predictive Value	59.04%	55.36% to 62.61%
Negative Predictive Value	5.88%	0.86% to 31.12%
Accuracy	50.00%	39.83% to 60.17%

Sensitivity of REMS was 75.38% and specificity was 2.86% at 95% confidence interval.

Table 14: Diagnostic accuracy of NEWS score

Statistic NEWS	Value	95% CI
Sensitivity	73.85%	61.46% to 83.97%
Specificity	8.57%	1.80% to 23.06%
Positive Predictive Value	60.00%	55.69% to 64.16%
Negative Predictive Value	15.00%	5.26% to 35.94%
Accuracy	51.00%	40.80% to 61.14%

Sensitivity of NEWS was 73.85% and specificity was 8.57% at 95% confidence interval.

Discussion

Study aimed to compare the efficacy of REMS and NEWS in prediction of hospital outcomes in patients of sepsis. In present study total of 100 patients fulfilling inclusion criteria were included with mean age of 55.02±14.5yrs of age. Among them 40% were female patients and 60% were male patients. Among the participants, 60% were male and 40% were female patients.

Diabetes mellitus was present in 36% of the patients, hypertension was present in 44% of the patients. Whereas, diabetes mellitus with hypertension was present in 24% of the patients. The focus of sepsis was majority with 38% with respiratory infections, 28% with abdominal infections, 24% genitourinary infections and 1% with CNS infections. In 9% of the patients focus of sepsis could not be determined.

On isolation of the organism, study documented the most common organism was Escherichia Coli in 21% of the patients, followed with 18% of the patients with MRSA, 15% of the patients with Klebsiella pneumoniae, 11% of the patients with Staphylococcus Aureus and 9% of the patients with Pseudomonas Aeruginosa, 5% of the patients with Acinetobacter Baumanii, 7% of the patients with Enterococcus, 2% of the patients with Candida Albicans, 1% of the patients with *Morganella morganii* and *Burkholderia cepacia.* No growth in culture was seen in 9% of the patients.

On assessment of length of hospital stay, study documented 59% of the patients with

less than 7 days of hospital stay, followed with 38% of patients with more than 7 days of hospital stay. 2% of the patients had hospital stay of >10 days and 1% of the patients had hospital stay of <5 days.

ICU admission was documented in 92% of the included patients. Among the patients, dialysis requirement was seen in 7% of the patients. The requirement of CPR was seen in 35% of the included patients. The present study documented the mortality in 35% of the patients. On assessment of the vital parameters between the survivor group, patients with lower SBP, DBP, SPO2, MAP and GCS had poor outcomes like death when compared to the patients who survived.

On comparison of the various parameters with outcome, patient with DM, HTN and deranged AVPU score had poor outcomes like death as compared to patients who survived. On comparison of various parameters with outcome, patients who required ICU and CPR had poor outcome like death as compared to the patients who survived. On assessment of the REMS and NEWS score with outcome of the patients, it was documented that the p value was significant for both the scores to assess the outcome in patients of sepsis. ($p<0.05$).

The ROC analysis showing the predictability of the outcome using the REMS and NEWS scoring system. Study found both are significant in predicting the worst outcome in the patients, between the scores REMS was superior with AUC of 0.753 compared to the NEWS with AUC of 0.703.($p<0.05$). Sensitivity of REMS was 75.38% and specificity was 2.86% at 95% confidence interval. Sensitivity of NEWS was 73.85% and specificity was 8.57% at 95% confidence interval.

Conclusion

Study concludes with presence of significant association between the outcome of sepsis patients with the REMS and NEWS scores. The study found REMS and NEWS scoring as important predictors for the mortality among the patients admitted with sepsis. REMS was found to be superior to NEWS scoring in predicting the worst outcome among the study subjects. Further larger studies are required to strengthen the findings of present study by comparing various other predictor scoring system with the REMS.

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