



RESEARCH ARTICLE

EVALUATION OF SICK (SIGNS OF INFLAMATION THAT CAN KILL) SCORE IN PREDICTING MORTALITY AND DURATION OF STAY OF PATIENTS IN PICU IN RURAL TERTIARY CARE CENTRE

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Abstract

Background: Mortality in critically ill children occurs in first 24 hour of admission. Therefore, immediate assessment of children at admission with a rapid clinical score is required. Early identification and proper triage of patients, allocation of available resources based on severity of illness is essential for effective management of critical illness. In this study SICK SCORE is used to predict mortality at admission.

Methods: This is a prospective observational study of 100 patients over a period of two years at a rural tertiary center. The assessment using SICK SCORE was done on arrival prior to initiation of treatment for children admitted in PICU. A SICK SCORE variable (temperature, heart rate, respiratory rate, systolic blood pressure, saturation, capillary refill time, sensorium by AVPU scale) was measured using standard guidelines. Each variable is scored 0 to 1, higher the score higher is the prediction of mortality.

Results: The study included 100 children admitted in PICU, children between 1 month to 17yr were included in this study, there were 10 deaths (all three had SICK SCORE >6, with 70% sensitivity and specificity 5 %) during study period of 2 years. The mortality risk and duration of stay was found to be increasing with increase in SICK score.

Conclusion: Substantially increased rate of mortality and lengthy duration of hospital stay was observed among SICK children who had higher sick score at admission. Hence, we conclude, SICK score is extremely useful in predicting mortality and lengthy stay on admission to hospital and it is also simple and cost-effective scoring system for triaging in resource limited settings.

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Introduction:-

Mortality in critically ill children is maximum in the first 24 hours. Mortality depends on the quality of care received in the first 24 hours of being ill. Need of the hour is a rapid clinical scoring system that PREDICTS mortality on admission.

Early identification and proper triage of patients, judicious allocation of resources and personnel, appropriate stratification based on severity of illness is essential for effective management of critical illness.

The SICK score, which stands for Signs of Inflammation in Children that Can Kill, is a novel indicator of the severity of an illness. It makes use of the Systemic Inflammatory Response Syndrome (SIRS) continuation known as Multiple Organ Dysfunction Syndrome (MODS) in order to forecast the severity of disease and mortality at time of first encounter.

Aims & Objectives:-

Aim of the study is to evaluate the usefulness of the sick score in predicting the mortality on admission. To predict the duration of stay in hospital.

Research Methodology:-

This study is a prospective study where in sick score is used to assess the severity of illness and predict mortality on admission in PICU admitted children and also predict the duration of stay in the hospital. The study was conducted at MVJ medical college Hoskote Bengaluru, for a period of 2 years till the estimated sample size was reached.

Children admitted through the emergency ward were assessed in the emergency ward itself using SICKS score.

The variables –

1. temperature,
2. heart rate,
3. respiratory rate,
4. systolic BP,
5. O₂ saturation,
6. capillary refill time,
7. sensorium by AVPU scale at the time of admission.

Temperature was measured in the axillary region using mercury thermometer/digital thermometer, blood pressure was measured using sphygmomanometer of appropriate size cuff. O₂ saturation was measured using pulse oximetry, RR was counted for 1 min. Consciousness was assessed based on AVPU scale (alert, response to verbal comments, response to pain stimuli, unconsciousness). Abnormal values for heart rate, respiratory rate, temperature, and blood pressure were according to standard SIRS criteria. Consciousness was noted using AVPU score. Except alert (A) of AVPU, all other states of consciousness were taken as abnormal. AVPU was taken for rapid assessment of sensorium because it requires only four observations for its assessment. The abnormal values for Spo₂, Capillary refill time and AVPU were as per Advanced Paediatric Life Support.

Normal values were assigned a score of 0 and abnormal values assigned a score of 1. The hospital discharge status (death/survival) was the primary outcome variable, Duration of the hospital stay was noted/recorded.

Inclusion Criteria

Children included in the study were all children who were 1 month to 12 years admitted in PICU,

Exclusion Criteria

1. Children who went Discharge against medical advice
2. Admitted in relation to surgical conditions
3. Children who were referred for higher center for further management were excluded from the study.
4. Children below the age of one month

Statistical Methodology:

Scoring Of Abnormal Clinical Variables.

Table 1:- Scoring of clinical variables.

VARIABLE	ABNORMAL RANGE
Temperature	>38°C <36°C
Heart rate	Infant >160/min Child >150/min
Respiratory rate	Infant >60/min Child >50/min
Systolic blood pressure	Infants <65 mmHg Child <75 mmHg

Capillary filling time	>3 seconds
A-alert	Anyone except A
V-responds to voice	
P-responds to pain	
U- Unresponsiveness	

Results:-**Table 2:- Association Of Sick Score With Outcome.**

SICK SCORE CLINICAL VARIABLES		Frequency	Percentage
Temperature	Abnormal ($>38^{\circ}\text{C}$, $<36^{\circ}\text{C}$)	80	80%
	Normal	20	20%
Heart rate	Abnormal (Infants >160 , Children >150)	23	23%
	Normal	77	77%
Respiratory rate	Abnormal (>60 for 2 months; >50 for 2 to 12 months; >40 for 1-5 years; >30 for 6 to 12 years)	40	40%
	Normal	60	60%
SBP	Abnormal (Infants $<65\text{mmHg}$, children $<75\text{mmHg}$)	18	18%
	Normal	82	82%
SpO ₂	Abnormal (>90)	29	29%
	Normal	71	71%
Capillary refill time	Abnormal ($>3\text{Sec}$)	19	19%
	Normal	81	81%
AVPU	Abnormal (Verbal, Pain, and unconscious)	38	38%
	Normal	62	62%

In this study, maximum number of cases had abnormal temperature (80%) followed by abnormal respiratory rate (40%), abnormal consciousness level (38%), abnormal oxygen saturation (29%), abnormal capillary refill time (19%) and abnormal systolic blood pressure (18%).

SICK SCORE		OUTCOME		Total	P VALUE
		DISCHARGED	EXPIRED		
0	Count(%)	3 (100.0%)	0	3 (100.0%)	0.000
1	Count(%)	10 (100.0%)	0	10 (100.0%)	
2	Count(%)	14 (100.0%)	0	14 (100.0%)	
3	Count(%)	17 (100.0%)	0	17 (100.0%)	
4	Count(%)	17 (100.0%)	0	17 (100.0%)	
5	Count(%)	14 (100.0%)	0	14 (100.0%)	
6	Count(%)	10 (76.9%)	3 (23.1%)	13 (100.0%)	
7	Count(%)	5 (41.7%)	7 (58.3%)	12 (100.0%)	

T	Count(%)	90	10	100	
otal		(90.0%)	(10.0%)	(100.0%)	

There was no mortality in subjects with SICK score 5 or less. Mortality was seen only among subjects with SICK score of 6 and 7. The association was found to be statistically significant between SICK scores and the outcome of the study participants.

Table 3:- Association Of Range Of Sick Score With Duration Of Hospital Stay.

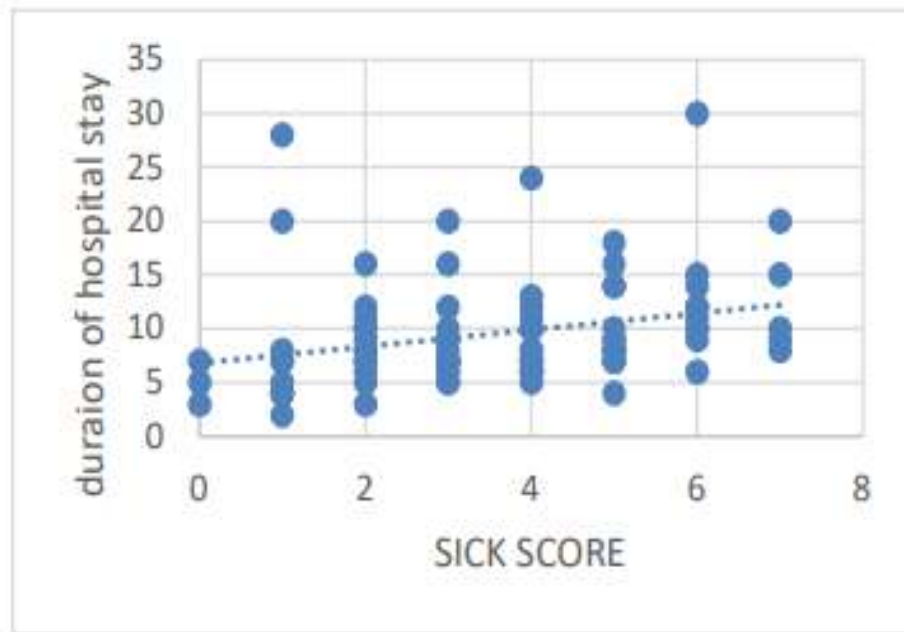
SICK SCORE		DURATION OF HOSPITAL STAY				Total	P VALUE
		1-3 days	4-6 days	7-9 days	>10 days		
0 - 2	Count	3	7	9	8	27	0.000
	(%)	(11.1%)	(25.9%)	(33.3%)	(29.6%)	(100.0%)	
		)	)	)	)	)	
3-5	Count	-	9	21	18	48	0.000
	(%)		(18.7%)	(43.7%)	(37.5%)	(100.0%)	
			)	)	)	)	
> 5	Count	-	2	6	7	15	0.000
	(%)		(13.3%)	(40%)	(46.6%)	(100.0%)	
			)	)	)	)	
Total	Count	3	18	36	33	90	0.000
	(%)	(3.3%)	(20.0%)	(40%)	(36.6%)	(100.0%)	
			)	)	)	)	

46.6% of children with SICK score more than 5, stayed for more than 10 days compared to 37.5% of children with SICK score of 3-5 and 29.65% of children with 0-2 SICK score. Higher duration of hospital stay was seen among patients with SICK score of >5. The association was found to be statistically significant between sick score and the duration of hospital stay

Table 4:- Correlation Between Sick Score And Duration Of Hospital Stay.

		SCORE
HOSPITAL STAY	Pearson Correlation	0.277
	Sig. (2-tailed)	0.008

Positive correlation was found between sick score and duration of hospital stay and this correlation was found to be statistically significant.



Conclusion:-

SICK score performed extremely well in predicting mortality on admission in a tertiary Paediatric care centre. Predicting mortality on admission paves way for intervention in the Golden hour thereby can drastically reduce mortality. Higher duration of stay was found among study participants with sick score > 4.

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