Utility of Sepsis in Obstetric Score to Identify Risk of Intensive Care Unit Admission from Sepsis in Pregnancy

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Abstract:

Introduction:- Sepsis prevention should be the primary objective with focus on strategies to improve antenatal care. The main objective of our study was to prospectively assess the usefulness of the Sepsis in Obstetric Score to identify women at risk of ICU admission for sepsis in pregnancy.

Material and Methods:- The present prospective and observational study was conducted in the Postgraduate Department of Obstetrics and Gynaecology, Lalla Ded Hospital over a period of 18 months on 130 patients. After obtaining ethical clearance from Institutional Ethical Committee and proper inclusion and exclusion criteria, women presenting with signs and symptoms of sepsis were enrolled for study and evaluated for various parameters.

Results:- This study demonstrated women experience the highest rates of sepsis in their second and third decades of life. A higher risk of infection is linked to pregnancy because of the mechanical and physiological changes it causes. Majority of our patients who required ICU admission had an SOS of ≥ 6. Moreover, individuals with SOS ≥ 6 had significantly greater rates of maternal mortality and longer hospital stays. The ROC analysis revealed that with a sensitivity of 89.5%, specificity (93.7%), diagnostic accuracy (93.1%), the optimal cutoff for SOS in predicting the ICU admission and maternal outcome was ≥ 6.

Conclusion:- The consistent rising in ICU admission rate, hospital stay and mortality rates for higher SOS scores infers that SOS is a useful prognostic tool for early assessment and triaging of the severity among patients suffering from pregnancy associated with sepsis.

Keywords:- Sepsis in Obstetric Score, ICU admission, Systemic Inflammatory Response Syndrome.

Introduction

Sepsis prevention should be the primary objective with focus on strategies to improve antenatal care. Albright CM et al. (2014) described an emergency department scoring system, the Sepsis in Obstetrics Score (SOS), specifically designed for an obstetric population to assess the risk of

ICU admission for pregnant and postpartum women presenting signs of sepsis.[1]

The 'Sepsis in Obstetrics Score' combines parameters from Rapid Emergency Medicine Score (temperature, heart rate, respiratory rate, and oxygen saturation)[2] as well as the SIRS (Systemic Inflammatory Response Syndrome) and sepsis criteria as defined by the Surviving Sepsis Campaign (systolic blood pressure [BP], heart rate, leukocyte count, percentage of immature neutrophils, and lactic acid)[3] and modifies those parameters that are expected to change in pregnancy. The temperature, respiratory rate, and oxygen saturation cut-offs are the same as in Rapid Emergency Medicine Score. The percentage of immature neutrophils and lactic acid cut-offs is unchanged from the SIRS criteria. The systolic BP considered normal is the same as the cut-offs used for septic shock (90 mm Hg or greater). Systolic BP is used because it varies less throughout pregnancy than diastolic BP. Because heart rate increases by approximately 20% throughout pregnancy, an abnormal heart rate in the 'Sepsis in Obstetrics Score' is 120 beats per minute or greater, 20% higher than the upper limit for SIRS. Finally, the upper limit of normal for leukocyte count is defined as 16.9/ microliter, the upper limit of normal in the third trimester[4-7].

Few studies have been conducted on the practical application of SOS and most of these have been retrospective in nature; Therefore, this focused prospective study aimed to assess the predictability of severe sepsis and organ failure (OF) in patients with pregnancy-associated sepsis (PAS) using the SOS. The main objective of our study was to prospectively assess the usefulness of the Sepsis in Obstetric Score to identify women at risk of ICU admission for sepsis in pregnancy and also to assess maternal outcomes, positive blood cultures and the Assess length of hospital stay.

Material and Methods

The present prospective and observational study was conducted in the Postgraduate Department of Obstetrics and Gynaecology, Lalla Ded Hospital, an associated hospital of Government Medical College, Srinagar over a period of 18 months after obtaining ethical clearance from Institutional Ethical Committee and written informed consent in local language from patients. All women presenting with signs and symptoms of suspected sepsis were enrolled for study and evaluated for severity.

All pregnant, post-abortal upto 2 weeks and post-partum upto 6 weeks were included however all non-obstetric cases of suspected sepsis and Ectopic pregnancies were excluded from study.

Methodology

All pregnant women (with confirmed intrauterine pregnancy), post-abortal (2 weeks) and postpartum women (upto 6 weeks) with suspected sepsis were evaluated and investigated using SIRS (systemic Inflammatory Response Syndrome)/sepsis criteria.

A separate documentation of patient's parameters was done according to the SOS criteria. The patients were distributed based on proposed SOS cut off of 6; those with SOS≥6 and those with SOS<6.

The Patients were followed for maternal outcome, Intensive care unit (ICU) admission, Length of Hospital stay. Detailed clinical, pertinent laboratory and imaging tests were performed for all enrolled patients. Blood, high vaginal swab, and pus (if present) culture were sent for bacterial culture and sensitivity. Venous lactic acid levels were obtained along with other haematological investigations at admission. The choice of venous sample for lactic acid estimation was based on the recent NICE guidelines which have considered venous values almost equivalent to arterial samples. The recorded data was

compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Chi-square test or Fisher's exact test, whichever appropriate, was employed for assessing association outcome parameters with SOS. In order to determine the optimal cut-off of SOS in predicting ICU admission, ROC analysis was performed. Further diagnostic accuracy (Sensitivity, Specificity, PPV and NPV) of SOS in predicting ICU admission was also obtained. A P-value of less than 0.05 was considered statistically significant.

The primary objective was whether SOS could possibly help in effective triage of such patients for critical care in the emergency department of our tertiary care hospital.

Observation and Results

The present prospective observational study was conducted in the Obstetrics and Gynecology Department of Lalla Ded Hospital over a period of 18 months. A total of 130 patients who met our study inclusion criteria were evaluated for maternal sepsis using the SOS and primary and secondary outcomes. We find that with a mean age of 30.1±3.14 years, the majority of our patients 46.2% were in the age group of (30-34) years, followed by 43.8% in (30-34) years and 10% patients in 35 years or above age group. We find that the majority of our patients were multigravida (58.5% versus 41.5% of patients with primigravida status. We had 91.5% of pregnant patients, followed by 4.6% of patients with postpartum status and 3.8% of patients with postabortion status. We find in our study that there were statistical differences in heart disease but no significant difference in other comorbidities. Three subjects with aSOS of≥ 6 had underlying cardiac disease,

including one patient with severe mitral stenosis with pulmonary hypertension, one patient with rheumatoid valvular heart disease, and one patient with hypertrophic obstructive cardiomyopathy (HOCM). One patient with SOS <6 had mild heart valve disease. There was no statistical significance regarding other comorbidities in the two groups.

When the clinical parameters of the examined patients were assessed, we found that the mean temperature, mean SBP, mean heart rate, mean respiratory rate, mean Spo2 and mean TLC were 102.1F, 127.6 (mmHg), 128 .9 (beats/minute), 20.1 (breaths/minute), 94.6 (%) and 25200, respectively. We observed that 60.8% patients had immature neutrophils < 10, followed by 39.2% patients with immature neutrophils ≥ 10. The serum lactic acid < 4 was found in 74.6% patients as opposed to 25.4% patients with serum lactic acid ≥ 4. Positive blood cultures were found in 20.8% patients and 79.2% patients had negative blood culture.

We noted that out of total 130 patients, only 19 patients (14.6%) were admitted to the ICU, whereas 111 patients (85.4%) did not require ICU admission.

We observe that with a mean hospital stay of 7.3±3.18 days, majority of our patients (52.3%) stayed in the hospital for 7-10 days, followed by 31.5% patients who stayed in the hospital for less than 7 days, and16.2% patients who stayed in the hospital for more than 7 days . We observe in our study single organ failure (OF) in 26.3%, 2 OF in 15.8%, 3 OF in 26.3% and ≥4 OF in 31.6%. We observe that out of 130 patients, only 3 patients succumbed to (multiorgan dysfunction syndrome) MODS, thus placing the mortality rate of 2.3% and 97.7% recovered successfully.

Table 1:- Descriptive data of study

Age distribution	24-29 Years	60 (46.2%)	Mean±SD (Range)=30.1±3.14 (24-36 Years)
	30-34 Years	57 (43.8%)	
	≥ 35 Years	13 (10%)	
Parity	Primigravida	54 (41.5%)	
	Multigravida	76 (58.5%)	
Pregnancy status	Pregnant	119 (91.5%)	
	Post-partum	6 (4.6%)	
	Post-abortal	5 (3.8%)	
Clinical Parameter	Temperature (F)	102.1 SD 1.32 (99.1 - 104)	
	SBP (mmHg)	127.6 SD 11.95 (90-148)	
	HR (beats/min)	128.9 SD 8.72 (110-150)	
	Respiratory rate (breaths/min)	20.1 SD 2.84 (16-26)	
	Spo2 (%)	94.6 SD 1.85 (89-98)	
	TLC ('000)	25.2 SD 5.73 (18-38)	
Biochemical parameters	Immature neutrophils (%)	< 10	79 (60.8%)
		≥ 10	51 (39.2%)
	Serum lactic acid (mmol/ltr)	< 4	97 (74.6%)
		≥ 4	33 (25.4%)
	Blood cultures	Negative	103 (79.2%)
		Positive	27 (20.8%)
Culture positivity in pregnancy associated sepsis	Blood Culture (n=27)	MRSA	4 (14.8%)
		Staphlococcus aureus	21 (77.8%)
		Klebsella	2 (7.4%)
	Urine culture (n=20)	E. coli	16 (80.0%)
		No growth	4 (20.0%)
	Genital infection (n =16)	E. coli	9 (56.3%)
		Staphlococcus aureus	7 (43.8%)
	Wound infection (n=3)	E. coli	2 (66.7%)
		Staphlococcus aureus	1 (33.3%)
ICU admission	Yes	19 (14.6%)	
	No	111 (85.4%)	
Length of hospital stay (Days)	< 7 Days	41 (31.5%)	Mean±SD=7.3±3.18
	7-10 Days	68 (52.3%)	
	> 10 Days	21 (16.2%)	
Maternal outcome	Death	3 (2.3%)	
	Recovered	127 (97.7%)	

Table 2: Diagnostic accuracy of sepsis in obstetric score (SOS) in predicting ICU admission

Parameter	Value	95% CI
Optimal cutoff	≥ 6	-
Sensitivity	89.5	68.6-97.1
Specificity	93.7	87.6-96.9
PPV	70.8	50.8-85.1
NPV	98.1	93.4-99.5
Accuracy	93.1	87.4-96.3
AUC	0.961	0.911-0.987

CI: Confidence Interval; AUC: Area under ROC curve

Table 3:- SOS correlation with various parameters

		SOS ≥ 6 [n=24]	SOS < 6 [n=106]	p Value
organ failure (Number of failure organs)	1	5 (26.3%)	22 (64.7%)	0.012*
	2	3 (15.8%)	7 (20.6%)	
	3	5 (26.3%)	2 (5.9%)	
	≥ 4	6 (31.6%)	3 (8.8%)	
Working diagnosis	Endometritis	8 (33.3%)	28 (26.4%)	0.026*
	Septic abortion	4 (16.4%)	5 (4.7%)	
	Chorioamnionits	6 (25.0%)	14 (13.2%)	
	Mastitis	4 (16.7%)	21 (19.8%)	
	Pneumonia	2 (8.3%)	38 (35.8%)	
Outcome parameters	ICU Admission — Yes	17 (70.8%)	2 (1.9%)	<0.001*
	ICU Admission — No	7 (29.2%)	104 (98.1%)	
	Maternal death — Yes	3 (12.5%)	0 (0%)	0.006*
	Maternal death — No	21 (87.5%)	106 (100%)	
	Length of hospital stay (Days) — < 7 Days	3 (12.5%)	38 (35.8%)	<0.001*
	Length of hospital stay (Days) — 7-10 Days	7 (29.2%)	61 (57.5%)	
	Length of hospital stay (Days) — > 10 Days	14 (58.3%)	7 (6.6%)	
Comorbidity	Hypertension	16 (66.7%)	52 (49.1%)	0.119
	Diabetes Mellitus	8 (33.3%)	38 (35.8%)	0.816
	Cardiac disease	3 (12.5%)	1 (0.9%)	0.019*
	Asthma	2 (8.3%)	3 (3%)	0.229
	Hypothyroid	18 (75%)	62 (58.5%)	0.133

*Statistically Significant (P-value<0.05)

We observe that with a sensitivity of 89.5%, specificity (93.7%), diagnostic accuracy (93.1%), the optimal cut-off for SOS in predicting the ICU admission was ≥ 6.

We observed in our study, those with SOS≥6 had endometritis and chorioamnionitis as the most common clinical diagnosis at presentation, whereas pneumonia in study subjects with SOS<6.
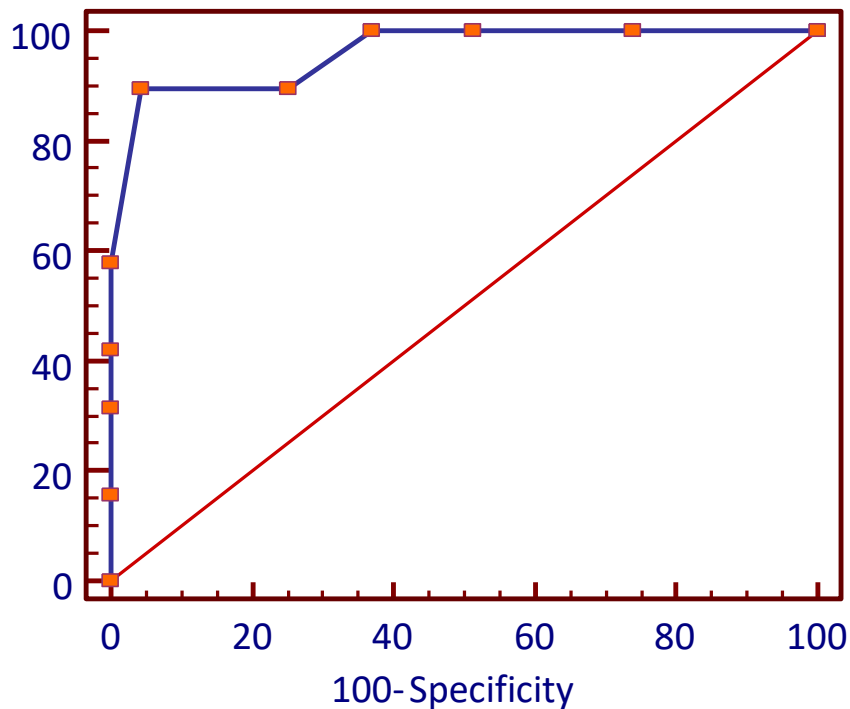
Sepsis in obstetric score (SOS)

Figure 1: ROC Curve for ICU admission on the basis of SOS

Figure 1 showing Receiver operating characteristic curve (ROC Curve) for intensive care unit admission (ICU) on the basis of 'Sepsis in Obstetric Score' (SOS). This curve shows the area under curve (AUC) for predicting the maternal outcome which is 0.961.

We observe that out of 24 patients with SOS ≥ 6, 70.8% patients needed ICU admission and from a total of 106 patients with SOS < 6, only 1.9% patient's needed ICU admission and the difference was statistically significant. The maternal death was significantly high among patients with SOS ≥ 6 compared to patients with SOS < 6 (12.5% vs. 0%; p-value <0.006). And the proportion of patients with length of hospital stay beyond 10 days was significantly high among patients with SOS ≥ 6 compared to patients with SOS <6.

Discussion:- A novel sickness severity scoring system, famously known as the 'Sepsis in Obstetrics Score' (SOS) was introduced by Albright et al (2014), [8] for the purpose of triaging patients with sepsis in pregnancy in an emergency setting. Only a few more studies on the practical use of SOS have been conducted, but they were all retrospective in nature. With this in mind, the present prospective study was primarily conducted to assess the utility of the sepsis in obstetric score to identify women at risk for ICU admission for sepsis in pregnancy. The secondary objective of the study was to find out the maternal outcomes, positive blood cultures, and length of hospital stay for such patients. In the present study, a total of 130 patients were included in the study who strictly met the inclusion criteria of the study. We have comprehensively analyzed patients' data on the basis of demographic characteristics, clinical and biochemical aspects, distribution of patients as per ICU admission, length of hospital stay, maternal outcomes and diagnostic performance of SOS in predicting the ICU admission. We observed that with an average age of (30.1±3.14) years, the majority of our patients (46.2%) were belonging to the age group of (24-29) years, followed by 43.8% belonging to the age group of (30-34) years and 10% patients were aging 35 years or above. Albright et al (2014), in their study reported that average age of their patients was 26.1 years, which is comparable with our study.[24] The demographic trait like age of patients

developing pregnancy associated sepsis(PAS) has been reported varyingly in the literature ranging from an average age of 25.8 years to 32 years, which is consistent with our study.[9,10] Likewise to our study, the rate of PAS event in teens and among women older than 34 years has been reported infrequently, with an incidence of 13.6% and 19.9%, respectively.[11] Majority of our patients were multigravida, accounting for 58.5% as opposed to 41.5% patients with primigravida status.

Even in patients whose source of infection is not intra-amniotic, pregnant women with sepsis are at a significant risk of perinatal problems such abortion, preterm birth, and foetal death. [12-15] Alteration in tests of fetal wellbeing during admission do not state immediate termination of the pregnancy before stabilization of the patient, unless we are facing imminent fetal death. The likelihood of maternal death is significantly increased when a patient is brought into a state of greater stress, such as ending a pregnancy.

Sepsis by itself does not warrant the termination of a pregnancy unless the underlying cause is the obstetric focus (chorioamnionitis). [16-17] We observed that 91.5% patients were pregnant, followed by 4.6% patients with post-partum status, and 3.8% patients with post-abortal status. Albright et al (2017) reported that 72.7% of their patients were pregnant and 27.3% had postpartum pregnancy status while as in another Albright et al, reported that 95.6% of their patients were pregnant and 4.36% had post-partum pregnancy status, which is consistent with our study. However; there were 67% patients with postpartum status, 9% with postabortal status and 24% had antepartum pregnancy status. [8,18]The variation in the incidence of patients with different pregnancy status may be attributed to the heterogenic study designs across different studies.

In our study those with S.O.S $\geq$ 6 had statistical difference for Underlying cardiac disease but no difference for other co-morbidities like hypertension, diabetes, asthma and hypothyroidism. Albright cm et al (2014) conducted a study which was comparable with our study with no statistical difference for any comorbidities[8].Of those with S.O.S $\geq$ 6 the most common diagnosis at presentation were endometritis (33.3%) followed by chorioamnionitis (25.0%), in contrast to those with S.O.S<6 most common presentation was pneumonia (38%). Albright CM conducted a study in which the most common diagnosis at presentation were pyelonephritis (25%), influenza like illness (25%) and endometritis (10.4%) in patients with SOS $\geq$6. The SOS incorporates parameters from the Acute Physiology and Chronic Health Evaluation (APACHE) II and Rapid Emergency Medicine Score (REMS), i.e., temperature, heart rate, respiratory rate, oxygen saturation, and Total leukocyte count (TLC), as well as the SIRS criteria (systolic blood pressure, leukocyte count, percentage of immature neutrophils, and lactate) for PAS (Pregnancy Associated Sepsis). The S.O.S. scoring process is comparable to that of APACHE II and REMS, and values for each variable range from 0 to 4, with a maximum score of 28. A score of 0 represents a normal value. For both high and low anomalous values, higher points were given.

In the presents study when the clinical parameters of the studied patients were assessed, we found that mean temperature, mean SBP (Systolic Blood Pressure), mean HR(Heart Rate), mean respiratory rate, mean Spo2 and mean TLC were 102.1F, 127.6 (mmHg), 128.9 (beats/min), 20.1 (breaths/min), 94.6 (%), and 25200 respectively. We observed that 60.8% patients had immature neutrophils < 10, followed by 39.2% patients with immature neutrophils $\geq$ 10. The serum lactic acid < 4 m mol/ltr was found in 74.6% patients as opposed to 25.4% patients with serum lactic acid $\geq$ 4 m mol/ltr. Positive blood cultures

were found in 20.8% patients and 79.2% patients had negative blood culture .The most common organism identified in positive blood culture was staphylococcus aureus (77.8%)whereas in urine and genital culture it was E.coli(80.0%) and (56.3%) respectively. Clinical indicators, including SBP≤90mmHg and SpO2<92% were found to be the most important predictors of severe sepsis in a study by Agarwal et al [19]. They reported that among laboratory indicators, Sr lactate ≥4 mmol/l was substantially higher in patients with severe sepsis and Sepsis with positive blood cultures was seen in 28% of cases, which is in line with our findings[19].

Those with SOS ≥ 6, 79.1% had organ failure (OF), compared to those with SOS <632.1%.In those with SOS ≥ 6, 26.3% had one OF, 15.8% had two OF, 26.3% had 3 OF and 31.6% had ≥ 4 OF. This study was comparable to the study done by R. Agarwal et al (2018) with 69 % subjects having OF with SOS ≥ 6 and 31% having OF with SOS <6 [19].In the present study, six subjects had multiorgan dysfunction syndrome (MODS) out of which 3 patients succumbed to sepsis with MODS and rest recovered.

Critically ill obstetric patients represent a small proportion of ICU admissions. Physiological changes of pregnancy along with pregnancy specific diseases may lead to rapid deterioration of the health status of the parturient warranting ICU care. In the present study, out of 130 patients, 14.6% patients were admitted to the ICU, which is consistent with the study conducted in UK by Acosta et al, where severe sepsis accounted for 14.4% of maternal ICU admissions[15]. In another study, Zwart et al, reported that severe pregnancy associated sepsis contributed to 9.9% of ICU admissions, which is compatible with our study[20]. Abright et al 2014, reported in their study that out of 850 patients with sepsis, the majority of whom were pregnant, only nine were admitted to the ICU, which places the ICU admission rate

at 1.1%, which is relatively low compared to the 14.4% observed in the present study[8]. The difference in the reported ICU admission rates among such patients can be attributed to the varying study designs, ethnic heterogeneity, limited ICU facilities, and different criteria for ICU admission across different studies. We observed that with a mean hospital stay of 7.3±3.18 days, majority of our patients (52.3%) stayed in the hospital for 7-10 days, followed by 31.5% patients who stayed in the hospital for less than 7 days, and16.2% patients who stayed in the hospital for more than 7 days.

Acosta et al, reported a median length of stay of 5 days in patients with PAS, which is comparable with our study[15]. Kramer et al., in a metaanalysis, found that hospital length of stay among PAS patients was reported infrequently, ranging from 10 to 19 days[10]. In their study, Albright et al. (2017) reported a markedly smaller mean hospital stay of 3.12 days for such patients, while in another study they reported that the mean hospital stay of their patients was 2.89 days, which is also relatively smaller than the 7.3 days observed in the present study.[8,10] The varied length of hospital stay in different studies may be attributed to the varying sepsis severity and heterogenic response rate of patients to treatments. In the present study, out of 130 patients, there were only 3 deaths thus placing the mortality rate of 2.3% and 97.7% recovered successfully. Acosta et al, in their study reported the mortality rate of 1.4% due to severe sepsis, which is consistent with our study[15].

In a study by Albright et al, although (14%) patients required a higher level of care for treatment of sepsis but there were no maternal deaths. [18] However; there are studies that have reported relatively higher mortality rates compared to our study; for instance, in a study by Holanda et al, twenty-two sepsis patients died resulting in a higher mortality rate of (14.2%) compared to the present study, and similar higher rates

were reported from African countries such as Malawi (16.4%) and South Africa (9.5%)[21-22]. The heterogenic death rates reported in different studies can be attributed to the wide range of diverse variables, such as different study designs, different disease severity, different comorbidities and patient characteristics.

In the present study, ROC analysis revealed that the area under curve for SOS in predicting the maternal outcome was 0.961. With a sensitivity of 89.5%, specificity (93.7%), diagnostic accuracy (93.1%), the optimal cutoff for SOS in predicting the ICU admission was ≥ 6. We observed that out of 24 patients with SOS ≥6, 70.8% needed ICU admission, and from the remaining 106 patients with SOS <6, only 1.9% needed ICU admission, and the difference was statistically significant. The rate of maternal death was significantly higher among patients with SOS ≥6 compared to none among patients with SOS <6 (12.5% vs. 0%; p-value =0.006). Furthermore, the proportion of patients with a SOS≥6 had significantly higher length of hospital stay compared to patients with a SOS<6. On the basis of 850 women tested retrospectively, Albright et al. developed the SOS score in (2014), the PAS-specific scoring system[24]. The aforementioned study has drawbacks, such as a lack of mortality data, although showing to be a reasonable emergency triaging index for obstetric sepsis. They reported that using a cutoff of ≥6, the S.O.S. had a sensitivity of 88.9%, a specificity of 95.2%, a PPV(positive predictive value) of 16.7%, NPV of 99.9% and the AUC for a cutoff of ≥6 was 0.92.[24] They found those with an SOS ≥6 and <6 were comparable demographically, however; an SOS ≥6 was independently associated with increased ICU or telemetry unit admissions, positive blood cultures, which is consistent with our study [8]. In another study by Albright et al, on the internal validation of the sepsis in obstetrics score to identify risk of morbidity from sepsis in pregnancy, the author

reported that a score of 6 or greater had a sensitivity of 64%, specificity of 88%, positive predictive value of 15%, and negative predictive value of 98.6%, which is compatible with our study [18]. Likewise to our study they found women with a score 6 or greater were more likely to be admitted to the ICU[18]. In a study by Agarwal et al, the SOS (at a cutoff score of 6) had a modest sensitivity (68.9%), a better specificity (80.9%), and a high positive predictive value (83%) for severe sepsis[19]. They reported that SOS >6 was statistically valid in predicting all forms of organ failures when compared to lesser scores[19]. PPV(positive predictive value) values from SOS/REMS/MEWS scores in published literature must be used with caution because they were based on real admissions to level 1 critical care units. Albright et al reaffirmed in their study with a threshold score of 6 having a negative predictive value of 98.6%, the Sepsis in Obstetrics Score is a validated pregnancy-specific score to determine risk of ICU admission for sepsis[18]. To the best of our knowledge, there are very few studies in the literature that could possibly be related to the results of our study. However, our comprehensive statistical analysis, supported with the results of two studies performed by Albright et al. and one study by Agarwal et al., strongly suggests that the optimal cutoff for SOS in predicting the obstetric ICU admission rate and maternal outcomes is SOS ≥ 6 [8,18-19]

Conclusion:- The present study demonstrated women experience the highest rates of sepsis in their second and third decades of life. A higher risk of infection is linked to pregnancy because of the mechanical and physiological changes it causes. We concluded in this study thatthere is consistent rising in ICU admission rate, length of hospital stay and mortality rates for higher SOS scores which infers that SOS is a useful prognostic tool for early assessment and triaging of the

severity among patients suffering from pregnancy associated with sepsis.

Declarations

Funding:- This study was not funded by any organization.

Ethical Approval:- This study was approved by the institutional ethical committee.

Informed Consent:- Informed consent was taken from all the participants of the study.

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