Original Article

Determinants of maternal mortality in a critical care unit: A prospective analysis

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ABSTRACT

Introduction: An admission of a pregnant woman to an intensive care unit (ICU) is considered as an objective marker of maternal near miss. Only a few studies from the Indian subcontinent have reported on the ability of ICU scoring systems in predicting the mortality in obstetric patients. **Methods:** A prospective analysis of all critically ill obstetric patients admitted to the critical care department was done. **Results:** In the period between April 2013 and September 2017, there were 101 obstetric admissions to the critical care ICU. Of these, 82 patients (81.2%) were discharged from the hospital, 18 patients (17.8%) died, and one left against medical advice. The common diagnoses seen in these patients were cardiac failure (*n* = 39; 38.6%); pregnancy-induced hypertension (*n* = 26; 25.7%); acute respiratory distress syndrome (*n* = 20; 19.8%); intra-abdominal sepsis (*n* = 19; 18.8%); tropical diseases (*n* = 19; 18.8%); and tuberculosis (*n* = 13; 12.9%).When we compared the survivors with the nonsurvivors, a higher severity of illness score and a low PaO_2/FiO_2 were found to increase the odds of death. The area of distribution under the receiver operator characteristic curve was 0.726 (95% confidence interval [CI] = 0.575–0.877), 0.890 (95% CI = 0.773–1.006), 0.867 (95% CI = 0.755–0.979), and 0.850 (95% CI = 0.720–0.980) for the PaO_2/FiO_2, Simplified Acute Physiology Score (SAPS) II, Sequential Organ Failure Assessment and Acute Physiology and Chronic Health Evaluation (APACHE) II score, respectively, for predicting mortality. The standardized mortality ratio was better with SAPSII than with APACHE II. **Conclusions:** Cardiac dysfunction is a leading cause of ICU admission. Obstetric patients frequently require ventilatory support, intensive hemodynamic monitoring, and blood transfusion. The APACHE II score is a good index for assessing ICU outcomes.

KEY WORDS: Echocardiography, maternal near miss, mortality, obstetric critical care

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INTRODUCTION

As defined by the World Health Organization, "maternal near miss" is a woman who survived a complication after coming close to death during pregnancy, childbirth, or within 42 days of termination of pregnancy.[1] The incidence of maternal near miss has been shown to relate to maternal mortality. An admission of pregnant women to an intensive care unit (ICU) is considered as an objective marker of maternal near miss.[2,3]

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Scoring systems are commonly used to quantify the severity of illness and the risk of mortality in ICU patients. However, there are no validated scoring systems for use with obstetric patients. An efficient scoring system can be a valuable tool to reduce maternal morbidity and mortality by aiding in the timely identification of high-risk patients and intensifying their management along with ensuring appropriate allocation of resources.[4] Various scoring systems such as Simplified Acute Physiology Score (SAPS) and Acute Physiology and Chronic Health Evaluation (APACHE) have been used to predict the outcome of obstetric patients in the developed world.[5,6] However, only a few studies from the Indian subcontinent have reported on the ability of these scores to predict the incidence of mortality in obstetric patients.[7,8]

A prospective analysis of all critically ill obstetric patients admitted to the critical care department was done to identify the common causes of obstetric patient admission to ICU, their clinical course, and the fetal and maternal outcome. The utility of different severity of illness scores to predict maternal mortality was also assessed in this study.

METHODS

A prospective analysis of all obstetric admissions to an eight-bed critical care unit of a tertiary care teaching hospital was conducted from April 2013 to September 2017. The hospital is a high-volume obstetric center and is a referral center for cases from various peripheral hospitals.

The patients were managed by the critical care team, comprising consultants and DM fellows. The admitting and referring obstetric unit provided consultation on daily basis. The critical care department has multiparameter monitors, microprocessor-controlled ventilators providing invasive and noninvasive ventilation, and a bedside ultrasound/echocardiography machine. A critical care echocardiography and lung ultrasound along with a deep-vein thrombosis screen is routinely performed in all patients.

The patients included in this study were critically ill obstetric patients requiring ventilator support or major organ supportive therapy. These patients were brought to the critical care department at various stages of pregnancy to 6 weeks after parturition.

Data collection: The data collected included basic demographic data, obstetric and medical history, hospital and ICU course, treatment including administration of vasopressor and ventilator support, and the maternal and fetal outcome. In all cases, the Sequential Organ Failure Assessment (SOFA), SAPS II, and the Acute Physiology and Chronic Health Evaluation (APACHE) II score was estimated at the time of admission.

Statistical analysis

All obstetric admissions were analyzed for their indications of admission, associated medical conditions, duration of stay, need for ventilator and vasopressor support, and maternal and fetal outcomes. Parametric data were represented as mean and standard deviations, and categorical data were presented as percentage. The Chi-square test was used to compare categorical variables. The Student's *t*-test was used to compare the variables between the different groups. Logistic regression was done to estimate the odds ratio for predicting mortality. $P < 0.05$ was considered statistically significant. A receiver operator characteristic (ROC) curve was generated for the SOFA, SAPS II, and the APACHE II scores to predict mortality.

RESULTS

In the period from April 2013 to September 2017, there were 101,248 deliveries and 110,416 obstetric admissions in the institution. When critically ill, these patients may be shifted to an ICU in the hospital. During the same period, the eight bedded ICU under the Department of Respiratory and Critical Care Medicine had a total of 1631 patients admitted which included 101 obstetric admissions (6.19%) of which the obstetric admissions comprised 101 women (6.19%). The details of the 101 patients are shown in Table 1. The mean age of the patients was 25.03 ± 4.47 years and the mean gestational age was 32.02 ± 7.43 weeks. Only 36 patients (35.6%) had received antenatal care during the pregnancy. The mean (± standard deviation) SAPSII score, SOFA score, and the APACHEII score were 40.40 ± 21.38, 8.27 ± 4.25, and 18.23 ± 7.88, respectively.

Of the 101 obstetric patients, 82 (81.2%) were discharged from the hospital and 18 (17.8%) died. One patient left the hospital against medical advice and no follow-up was available. The fetus was alive in 52 out of the 100 cases. Most patients had been shifted to the ICU after abortion/postpartum. The fetus was alive in 17 out of the 33 patients shifted before delivery.

The common diagnosis seen in these patients were cardiac failure ($n = 39$; 38.6%) mostly in patients with pregnancy-induced hypertension (PIH) ($n = 26$; 25.7%), acute respiratory distress syndrome (ARDS) ($n = 20$; 19.8%), intra-abdominal sepsis ($n = 19$; 18.8%), tropical diseases ($n = 19$; 18.8%), and tuberculosis (TB) ($n = 13$; 12.9%). When we assessed the mortality according to the different diagnoses [Table 2], we observed that maternal outcome was particularly bad when the patients had viral hepatitis or HELLP syndrome (with 100% case fatality rate).

When we compared the survivors with the nonsurvivors [Table 3], a higher severity of illness score (odds ratio [OR] = 1.09; 95% CI = 1.06–1.14; $P < 0.001$ for SAPS II, OR = 1.48; 95% CI = 1.26–1.74; $P < 0.001$ for SOFA and OR = 1.26; 95% CI = 1.14–1.38;

Table 1: Characteristics and outcomes of the study population (*n*=101)

Characteristic feature	*n* (%)
Age (years)**	25.03±4.47
Period of gestation (weeks)**	32.02±7.43
Antenatal care provided during pregnancy	36 (35.6)
Parity	
0 or 1	60 (59.4)
2/more	41 (40.7)
Timing of transfer	
Predelivery	33 (32.7)
Postdelivery	59 (58.4)
Postabortion	9 (8.9)
Site from transfer to ICU	
Transfer from emergency	11 (10.9)
Transfer from medicine ward	5 (5.0)
Transfer from obstetrics ward	85 (84.2)
Previous medical diagnosis of	
Hypertension	8 (7.9)
Hypothyroidism	2 (2.0)
Diabetes mellitus	2 (2.0)
Hemoglobin**	8.84±2.62
PaO_2/FiO_2**	223.03±104.75
SAPII**	40.40±21.38
SOFA**	8.27±4.25
APACHE II**	18.23±7.88
Diagnosis#	
Cardiac failure	39 (38.6)
Peripartum cardiomyopathy	7 (6.9)
Cardiac failure due to PIH	19 (18.8)
Septic cardiomyopathy	8 (7.9)
Cardiac failure due to underlying cardiac disease	5 (5.0)
Rheumatic heart disease	4 (4.0)
Atrial septal defect	2 (2.0)
Intra-abdominal sepsis	19 (18.8)
Viral hepatitis	3 (3.0)
TB	13 (12.9)
Lung involved by TB	8 (7.9)
Disseminated TB	8 (7.9)
Pneumonia	6 (5.9)
Tropical diseases	18 (17.8)
ARDS	20 (19.8)
TRALI	4 (4.0)
HELLP syndrome	4 (4.0)
PIH	26 (25.7)
Preeclampsia	17 (16.8)
Eclampsia	9 (8.9)
Asthma	5 (5.0)
Post-TB obstructive airway disease	1 (1.0)
Postpartum hemorrhage	8 (7.9)
Obstructed labor with uterine rupture	1 (1.0)
Infective endocarditis	1 (1.0)
Pneumothorax	2 (2.0)
Pulmonary embolism	1 (1.0)
Ectopic pregnancy	1 (1.0)
Number of patients requiring vasopressor support	58 (57.4)
Number of patients requiring ventilator support*	79 (78.2)
Patients requiring NIV	40 (39.6)
Average duration of NIV among patients using NIV**	3.83±2.27
Patients requiring IMV	46 (45.5)
Average duration of NIV among patients using NIV**	3.46±3.03
Patients receiving blood transfusion	55 (54.5)
Duration of ICU stay (days)**	4.73±3.23
Duration of hospital stay (days)**	6.91±3.99
Maternal outcome	
Patient left against medical advice	1 (1.0)
Alive	82 (81.2)
Death	18 (17.8)
Fetal outcome (alive)	52 (51.5)

*7 patients required both invasive and noninvasive ventilation, #Patients had more than one diagnosis, **Data expressed as mean±SD. Data expressed as *n* (%). ICU: Intensive care unit, PaO_2: Oxygen partial pressure, FiO_2: Fractional inspired oxygen, SOFA: Sequential Organ Failure Assessment, APACHE: Acute Physiology and Chronic Health Evaluation, TB: Tuberculosis, ARDS: Acute respiratory distress syndrome, HELLP: Hemolysis, elevated liver enzymes, low platelet, TRALI: Transfusion-related acute lung injury, NIV: Noninvasive ventilation, IMV: Invasive mechanical ventilation, PIH: Pregnancy-induced hypertension, SD: Standard deviation, SAPSII: Simplified acute physiology II

$P < 0.001$ for APACHE II score) and a low PaO_2/FiO_2 (OR = 0.9926; 95% CI = 0.9867–0.9985; $P = 0.011$) was found to increase the odds of death. All patients who died had required mechanical ventilation ($P = 0.010$) and vasopressor support ($P < 0.001$). Patients who could be managed with NIV had a good outcome ($P = 0.001$), but when they required invasive mechanical ventilation, they had higher odds of dying (OR = 32.78; 95% CI = 4.15–259.24; $P < 0.001$).

The ROC curve was generated to assess the ability of different scoring systems and the PaO_2/FiO_2 in predicting mortality. The area of distribution under the ROC curve was 0.726 (95% CI = 0.575–0.877), 0.890 (95% CI = 0.773–1.006), 0.867 (95% CI = 0.755–0.979), and 0.850 (95% CI = 0.720–0.980) for the PaO_2/FiO_2, SAPS II, SOFA, and APACHE II score, respectively [Figure 1].

DISCUSSION

The mean age of critically ill obstetric patients in the current study is similar to that reported in other Indian studies,[8-14] in contrast to studies from developed countries which report a relatively higher maternal age.[15-17] This is due to the younger age of marriage and subsequent pregnancy is seen in our population. The gestational age of obstetric patients at the time of admission to ICU has been reported to vary in different studies and is believed to reflect the common cause for admission.[18-20] ICUs with a high percentage of admissions due to postpartum hemorrhage report a higher gestational age of more than 34 weeks, while those with mostly patient with PIH have a relatively lower gestational age (usually <34 weeks).[18-20] In our ICU, most patients had PIH and had a relatively lower gestational age.

The common primary diagnosis leading to critical care admissions are reported to be obstetric hemorrhage[5,7,9-12,15,17,20-25] and PIH[5,11,13,16,20,21,26-30] in most of the studies from India and abroad. In our study, most of the cases had cardiac failure (38.6%); the routine use of bedside echocardiography helped us in identifying these cases and also guided a judicious use of inotropes and vasopressors in them. Various reasons have been speculated for the common occurrence of cardiac failure in obstetric patients.[31] Pregnancy is a time of unique cardiovascular adaptation with maternal physiology altering throughout gestation to support the demands of the growing fetus. These changes make the mother vulnerable to cardiac failure. Additionally, preexisting cardiovascular conditions can be exacerbated by the adaptations that occur during gestation. PIH was seen in 25.7% of the cases and obstetric hemorrhage in only 7.9% of the cases. In our center, most cases of obstetric hemorrhage are managed by the obstetric team in the labor room and rarely are they shifted to the ICU; hence accounting for the relative paucity of such cases in our study.

Table 2: Mortality in different diagnosis

Diagnosis	Survivors (*n*=82), *n* (%)	Nonsurvivors (*n*=18), *n* (%)	*P* (Fishers exact test)	Case fatality rate
Cardiac failure	34 (41.5)	5 (27.8)	0.424	12.82
Peripartum cardiomyopathy	7 (8.5)	0	0.345	0.00
Cardiac failure due to PIH	16 (19.5)	3 (16.7)	1.000	15.79
Septic cardiomyopathy	6 (7.3)	2 (11.1)	0.632	25.00
Cardiac failure due to underlying cardiac disease	5 (6.1)	0	0.582	0.00
Rheumatic heart disease	4 (4.9)	0	1.000	0.00
Atrial septal defect	2 (2.4)	0	1.000	0.00
Intra-abdominal sepsis	12 (14.6)	6 (33.3)	0.087	33.33
Viral hepatitis	0	3 (16.7)	0.005	100.00
TB	11 (13.4)	1 (5.6)	0.688	8.33
Lung involved by TB	7 (8.5)	1 (5.6)	1.000	12.50
Disseminated TB	6 (7.3)	1 (5.6)	1.000	14.29
Pneumonia	5 (6.1)	1 (5.6)	1.000	16.67
Tropical diseases	15 (18.3)	3 (16.7)	1.000	16.67
ARDS	18 (21.9)	2 (11.1)	0.515	10.00
TRALI	4 (4.9)	0	1.000	0.00
HELLP syndrome	1 (1.2)	3 (16.7)	0.018	75.00
PIH	23 (28.0)	3 (16.7)	0.388	11.54
Preeclampsia	15 (18.3)	2 (11.1)	0.730	11.76
Eclampsia	8 (9.8)	1 (5.6)	1.000	11.11
Asthma	5 (6.1)	0	0.582	0.00
Post-TB obstructive airway disease	1 (1.2)	0	1.000	0.00
Postpartum hemorrhage	6 (7.3)	2 (11.1)	0.632	25.00
Obstructed labor with uterine rupture	1 (1.2)	0	1.000	0.00
Infective endocarditis	1 (1.2)	0	1.000	0.00
Pneumothorax	1 (1.2)	1 (11.1)	0.329	50.00
Pulmonary embolism	1 (1.2)	0	1.000	0.00
Ectopic pregnancy	1 (1.2)	0	1.000	0.00

TB: Tuberculosis, ARDS: Acute respiratory distress syndrome, HELLP: Hemolysis, elevated liver enzymes, low platelet, TRALI: Transfusion-related acute lung injury, PIH: Pregnancy-induced hypertension

Another common diagnosis observed was sepsis (18.8% of the patients had intra-abdominal sepsis and 5.9% had pneumonia). Although most studies from developed countries report sepsis as a cause for ICU admission in about 5%–10% of the cases,[15,17,23,28,32] the overall percentage reported among Indian studies[9-11,13,33] is around 10%. Gombar *et al*.[8] had reported an admission rate due to sepsis to be as high as 27.15%, similar to our study. Our institute is a referral center for many hospitals and most patients with intra-abdominal sepsis had undergone an obstetric intervention before being shifted to our ICU postpartum. This probably explains the high prevalence of sepsis in our study.

Thirteen obstetric patients had tuberculosis; in nine patients, the diagnosis was made during the course of hospitalization and only four patients were already diagnosed at the time of transfer to the ICU. The testing of samples for TB is a routine practice in our ICU, which helps us identify TB in our patients. In high-burden settings, tuberculosis may be diagnosed in patients admitted to the ICU for nonrespiratory reasons, and an admission to the ICU is an opportunity to diagnose incidental pulmonary tuberculosis.[34] A recent study from Nigeria[35] had reported a high ICU admission rate due to a ruptured uterus (36%), though in our study, there was only one such case. This probably reflects the different sociodemographic and obstetric factors in the two populations studied. The incidence of ruptured uterus requiring critical care has also decreased in our population due to the increase in institutional deliveries over the last decade.

The mean length of ICU stay reported in the present study nearly matches many other studies from around the world and India.[8,12,16,23,25] Despite ICU care, 18 of our patients (17.8%) died. The maternal mortality reported among critically ill obstetric patients in developing countries is higher than that reported from developed nations. While some studies have reported zero mortality,[15,17] the mortality rate was consistently below 5% in other reports from ICUs of developed countries.[23,26,32] Similar studies from India have however reported a higher obstetric mortality rate of about 28%–41%.[7-10,27,28] A recent study had reported a mortality rate of 16.6%,[33] which is similar to our experience.

Previous authors have reported a mortality of 9.5%–29%[14,28,36] with PIH; while in our experience, the case fatality rate in PIH was 11.54%. We believe that the availability of bedside critical care echocardiography allowed us to identify and appropriately treat these cases well in time, thereby reducing mortality in these patients. We also observed a relatively good outcome in patients with ARDS; 18 of the 20 patients survived with good ventilator care. The reported case fatality due to sepsis varies from 19% to 44%;[14,36] in our study, the case fatality was 33.3% for intra-abdominal sepsis; 16.6% for pneumonia; and 16.6% for tropical diseases. We observed a high case fatality rate among patients with viral hepatitis

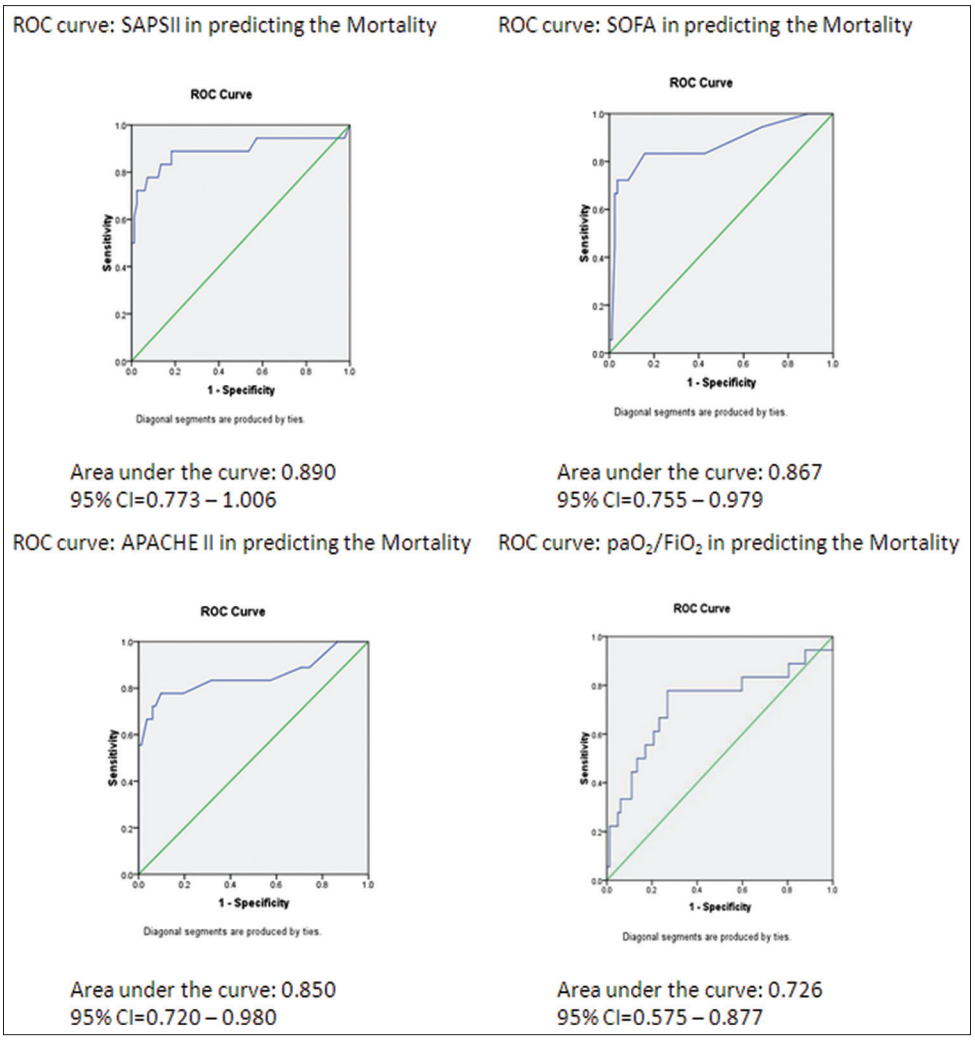

Figure 1: ROC curves for predicting mortality.

or HELLP syndrome. High fatality rates were also reported by other authors in patients with viral hepatitis.[28,36]

Although poor antenatal care has been reported to adversely impact the obstetric complications and outcomes,[29] the lack of antenatal care was not associated as a risk factor for maternal mortality in our study. This implies that the provision of antenatal care may not always prevent maternal complications and mortality. Although earlier studies suggest that there is higher maternal mortality in women with three or more parity,[37] in our study, we did not find parity to have a significant impact on the maternal outcome. In our experience, patients who had a higher severity of illness score and those who needed ventilator and hemodynamic support had higher chances of dying. It has been observed that hemodynamic and respiratory complications needing inotropic or ventilator support remain common reasons for ICU admissions and the need for support may predict poor outcomes.[29]

A number of ICU scoring systems have been used to determine the degree of severity and risk of mortality. The most frequently used scores are the SAPS II, SOFA, and APACHE scores. The predicted mortality by the SAPS II score[38] and the APACHE II score[39] was 25% and 29.1%, respectively, while the observed mortality was 17.8%. The standardized mortality ratio (SMR) is a ratio between the observed number of deaths in a study population and the number of expected deaths. The SMR for SAPS II was estimated to be closer to 1. We had a good area of distribution under the ROC curve for the multiparameter scores such as SAPS II, SOFA, and APACHE II. We also observed that the simple PaO_2/FiO_2 parameter had a fair area under the ROC curve.

In a retrospective study in 1996,[5] it was seen that the predictive ability of APACHE II and SAPS II scores to assess ICU outcomes of critically ill obstetric patients was as accurate as in nonobstetric critically ill females. However, recent studies have questioned the validity of these scores. It has been seen that when obstetric patients are admitted for medical disorders, the predicted mortality rate correlates with the observed mortality rate. However in obstetric patients admitted for nonmedical reasons, the

Table 3: Factors predicting mortality

Characteristics	Survivors (*n*=82), *n* (%)	Nonsurvivors (*n*=18), *n* (%)	*P*	OR
Age (years)	24.84±4.56	26.00±4.10	0.324	1.06 (0.95-1.17)
Parity				
0 or 1	52 (63.4)	7 (38.9)	0.067	1.0
2/more	30 (36.6)	11 (61.1)		2.72 (0.95-7.77)
Period of gestation (weeks)	32.34±7.12	30.78±8.96	0.423	0.97 (0.92-1.04)
Antenatal care provided during pregnancy	31 (37.8)	5 (27.8)	0.589	0.63 (0.21-1.94)
Site from transfer to ICU			0.419	
Transfer from emergency	8 (9.7)	3 (16.6)		1.0
Transfer from medicine ward	5 (6.1)	0 (0.0)		NE
Transfer from obstetrics ward	69 (84.1)	15 (83.3)		0.58 (0.14-2.45)
Timing of transfer				
Predelivery	26 (31.7)	7 (38.8)	0.762	1.0
Postdelivery	48 (58.5)	10 (55.6)		0.77 (0.26-2.27)
Postabortion	8 (9.8)	1 (5.6)		0.46 (0.05-4.36)
Previous medical diagnosis of				
Hypertension	8 (9.7)	0 (0.0)	0.344	NE
Hypothyroidism	2 (2.4)	0 (0.0)	1.000	NE
Diabetes mellitus	2 (2.4)	0 (0.0)	1.000	NE
Anemia present	55 (67.1)	11 (61.1)	0.784	0.77 (0.27-2.21)
Hemoglobin	8.92±2.65	8.67±2.46	0.711	0.96 (0.79-1.17)
PaO_2/FiO_2	233.72±94.51	165.79±128.77	0.011	0.9926 (0.9867-0.9985)
SAPSII	33.54±13.33	72.06±23.45	<0.001	1.09 (1.06-1.14)
SOFA	7.02±2.96	14.06±4.61	<0.001	1.48 (1.26-1.74)
APACHE II	15.87±4.92	28.94±10.09	<0.001	1.26 (1.14-1.38)
Number of patients requiring Vasopressor support	40 (48.8)	18 (100)	<0.001	NE
Number of patients requiring blood transfusion	43 (52.4)	11 (61.1)	0.605	1.42 (0.50-4.04)
Number of patients requiring ventilator support*	60 (73.2)	18 (100)	0.010	NE
Patients requiring NIV	39 (47.6)	1 (5.6)	0.001	0.06 (0.01-0.51)
Patients requiring IMV	28 (34.1)	17 (94.4)	<0.001	32.78 (4.15-259.24)
Duration of ICU stay (days)	5.07±3.17	3.28±3.23	0.033	0.77 (0.61-0.98)
Duration of hospital stay (days)	7.54±3.91	4.28±3.29	0.001	0.71 (0.56-0.88)

*Some patients required both invasive and noninvasive ventilator support. Data expressed as mean±SD, data expressed as *n* (%). NE: Not estimated, ICU: Intensive care unit, PaO_2: Oxygen partial pressure, FiO_2: Fractional inspired oxygen, SOFA: Sequential Organ Failure Assessment, APACHE: Acute physiology and chronic health evaluation, NIV: Noninvasive ventilation, IMV: Invasive mechanical ventilation, SD: Standard deviation, OR: Odds ratio, SAPSII: Simplified acute physiology II

observed mortality is often much lower than the predicted mortality.[18,30,40] This overestimation of the risk is partly explained by the fact that obstetric patients are relatively young and the physiological alteration in pregnancy can cause higher scores even in the absence of any pathology.[30] However, in an earlier study, no improvement was observed after modification of standard severity of illness scores of SAPS II and APACHE II according to altered maternal physiology in pregnancy; rather, APACHE II was observed to overestimate mortality, and SAPS II was found to be a good discriminator of illness severity.[6] Another possible explanation for the overestimated mortality is that certain obstetric pathologies can be rapidly reversed with effective and timely management. In our study, we observed that the SAPS II score was better in estimating mortality.

The limitation of our study is that the study cohort does not reflect all the critically ill patients in our center as it was not always feasible to transfer all critically ill patients to the ICU. Also, being a single-center study, the sample size was modest. Hence, it is not possible to generalize the results of the study for all settings. Also, though sociodemographic parameters, education, and delayed referrals are known determinants of maternal mortality, they were not assessed in the current study. The current study only focused on the determinants of maternal outcomes assessed after admission and evaluated the utility of different severity of illness scores to predict maternal mortality.

CONCLUSIONS

In our experience, cardiac dysfunction is a leading cause of ICU admission. The availability of bedside echocardiography is instrumental in not only diagnosing but also effectively choosing the appropriate inotropic/vasopressor agent. Accurate predictive scores in the ICUs apart from directing aggressive management in patients predicted for a poor outcome could also lead to better productive utilization of the limited resources, along with accurate monitoring of the quality of care and risk stratification for clinical and therapeutic trials. We have observed that the SAPS II score is a good index for assessing ICU outcomes. The current study highlights the need for a dedicated obstetric critical care facility in order to prevent complications in this patient group and mitigate the maternal and fetal mortality.

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Conflicts of interest

There are no conflicts of interest.

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