

**Prediction of mortality among critically ill
obstetric patients using the simplified acute
physiology score II and the Acute Physiology
and Chronic Health Evaluation II scores**

A comparative study

**Thesis submitted for partial fulfillment of the Master Degree
in Critical Care Medicine**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

" قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا
إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ "

صَدَقَ اللَّهُ الْعَظِيمُ

سورة البقرة الآية ٣٢

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ABSTRACT

Abstract

Introduction: Critically ill obstetric patients represent an interesting group with unique characteristics, whose management is challenged by the presence of a fetus, an altered maternal physiology and diseases specific to pregnancy. The Acute Physiology and Chronic Health Evaluation II (APACHE II) and simplified acute physiology score (SAPS II) scores, etc.; have been used to assess the severity of illness and to predict mortality and morbidity in critically ill obstetric patients, with conflicting results.

Aim of study: This is a prospective analytical study of obstetric patients admitted to the ICU, aiming at assessing the utility of SAPS II and APACHE II in the prediction of maternal mortality and morbidity.

Patient and Methods: 60 consecutive obstetrically ill patients were studied for complete physical examination, reporting the hemodynamic data in the first 24 hours and full laboratory investigations, and then all these data were applied to SAPS II, APACHE II and APACHE IV scores.

Results: 60 female patients with mean age of 27 ± 6 y (range of age between 18 y to 42 y), only 3 patients died (5%) and 57 patient survived (95%), the mean length of hospital stay in the ICU was 2.77 ± 2.27 days (range 1 to 15 days), The mean SAPS II score was 21 ± 13 , the mean APACHE II score was 16 ± 7 , the mean APACHE IV score was 51 ± 21 , The mortality prediction by SAP II, APACHE II, and APACHE IV scores were 8.5%, 26.7% and 6.3% respectively, The mean hospital "ICU" stay in survivors was 2.7 ± 2.3 , while that of non survivors was 2.67 ± 2.1 days showing no significant difference P value (0.938), The mean SAPS II, APACHE II, APACHE IV scores in survivors were 19.5 ± 10.2 , 15.4 ± 6.3 , 48.2 ± 16.2 respectively, while mean scores among the non survivors were 56.3 ± 18 , 28.6 ± 2.6 , 107.3 ± 29 respectively, showing higher significant values in non survivors P values (0.0001, 0.001 and 0.0001) respectively, scores were regressed on mortality status using logistic regression analysis. The predictability was assessed by goodness-of-fit test and receiver operated characteristic curve.

Conclusion: APACHE IV and SAPS II scores have more accurate mortality predictability than that of APACHE II score, while APACHE II score was more accurate regarding morbidity.

Key words : SAPS II - APACHE II - obstetric emergencies .

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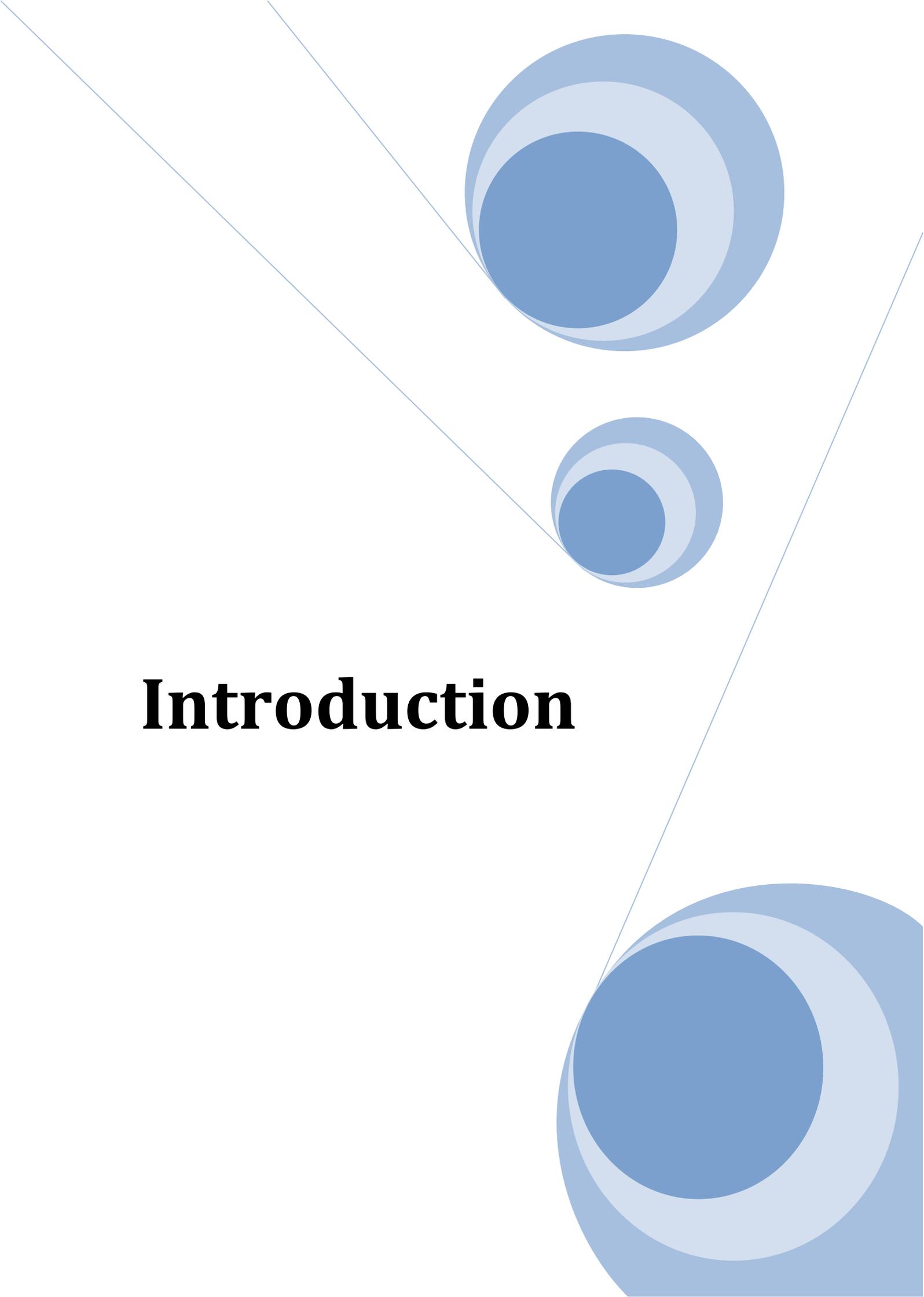
List of abbreviations

μL	Micro liter
ABGs	Arterial blood gases
ACE	Angiotensin converting enzyme
AF	Atrial fibrillation
AIS	Abbreviated injury score
APACHE	Acute Physiology and Chronic Health Evaluation
APS	Acute physiology score
aPTT	activated partial prothrombin time
ARDS	Acute respiratory distress syndrome
ARF	Acute renal failure
ATN	Acute tubular necrosis
AUC	Area under the curve
Bid	Twice daily
BP	Blood pressure
BUN	Blood Urea Nitrogen
C.I.	Confidence interval
CABG	Coronary angio bypass graft
CAP	Community acquired pneumonia
CBC	Complete blood picture
CHE	Chronic health evaluation
CPAP	Continuous positive airway pressure
CS	Cesarean section
CT	Computed tomography

D	Diagnostic category weight.
DIC	Disseminated intravascular thrombosis
DKA	Diabetic keto acidosis
DM	Diabetes mellitus
DVT	Deep venous thrombosis
e	The base of the natural logarithm
ECG	Electrocardiogram
EEG	Electroencephalogram
EF	Ejection fraction
ExpB	The estimate of the conditional odds ratio
FFP	Fresh frozen plasma
FIO₂	Inspiratory fraction of oxygen
FRC	Functional residual capacity
GCS	Glasgow coma scale
GFR	Glomerular filtration rate
HCO₃	Bicarbonate
HCT	Hematocrite
HELLP	Hemolysis, elevated liver enzymes and low platelet count
HUS	Hemolytic uremic syndrome
ICH	Intracranial hemorrhage
ICU	Intensive care unit
IM	Intramuscular
INR	International normalized ratio
ISS	Injury severity score
ITP	Idiopathic thrombocytopenic purpura

IV	Intravenous
LDH	Lactate dehydrogenase
LMWH	Low molecular weight heparin
<i>Logit</i>	The natural log of the odds
LOS	Length of the ICU stay
Ln	The Natural logarithm
LVH	Left ventricle hypertrophy
MELD	Model for end-stage liver disease
mEq	Mille equivalent
mm Hg	Millimeter mercury
mmol	Milli mol
MODS	Multi organ dysfunction syndrome
MRI	Magnetic resonant irradiation
MV	Mechanical ventillation
P (A-a) O₂	Alveolar arterial oxygen pressure gradient
P value	Statistical significance
PaO₂	Partial pressure of oxygen in arterial blood
PCO₂	Partial pressure of carbon dioxide in arterial blood
PE	Pulmonary embolism
PH	Power of Hydrogen ions
PIH	Pregnancy induced hypertension
PO	Per Os
PPCM	Peripartum cardiomyopathy
PPH	Peripartum hemorrhage
PRBCs	Packed red blood cells

PRN	Per needed
PT	Prothrombin time
PDR	Predicted death rate
r	Pearson's correlation coefficient
Rads	The unit of irradiation intensity
RBC	Red blood cell
ROC	Receiver Operating Characteristic
S	The risk imposed by emergency surgery
SAPS	Simplified acute physiology score
SD	Standard deviation
SOFA	Sepsis related organ failure assessment
SPSS	T-test value
TISS	Therapeutic intervention scoring system.
TLC	Total leukocytic count
T-test	Student test
TTP	Thrombotic thrombocytopenic purpura
u	Mann-Whitney test value
UOP	Urine output
VT	Ventricular tachycardia
WBCs	White blood cells
Wks	Weeks
X²	Chi-square test value

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Introduction

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Critically ill obstetric patients represent an interesting group with unique characteristics, whose management is challenged by the presence of a fetus, an altered maternal physiology and diseases specific to pregnancy.¹⁵⁷

Pregnant patients account for a small number of the intensive care unit (ICU) admissions in developed countries ($\leq 2\%$), but they can reach up to 10% or more in developing countries.⁶⁸

Separate intensive care units have been developed for cardiac, burns, respiratory, pediatric and neonatal care, but an ICU only for obstetric patients is not yet widely available in developing countries.⁹

Admission to the ICU for obstetric patients can be due to obstetric and non obstetric causes; Obstetric causes include: peripartum hemorrhage, shock, sepsis & multi organ dysfunction (MODS), pregnancy induced hypertension (PIH), HELLP syndrome and disseminated intravascular coagulopathy (DIC).⁷⁷