Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v31i3.4778

ANALYSIS OF MORBIDITY AND ADVERSE OUTCOMES IN PRE-ECLAMPTIC WOMEN USING THE FULLPIERS RISK PREDICTION MODEL: A CROSS SECTIONAL STUDY

Shehla Channa[1], Saira Dars[2], Saima Gaffar[3], Fahmida Gul[4]*, Kanwal Abbas[5], Nayab Qazi[6]

[1]Associate Professor OBG, Liaquat University of Medical & Health Sciences, Jamshoro.
Email: shehlaraza600@gmail.com
[2]Liaquat Assistant Professor of OBG, University of Medical & Health Sciences Jamshoro
Email: saira.dars@lumhs.edu.pk
[3] Assistant Professor of OBG. Liaquat University Hospital Jamshoro.
Email: saimagaffararain@yahoo.com
[4] *Lecturer of Anatomy, Liaquat University of Medical & Health Sciences Jamshoro.
Email: fahmida.gul@lumhs.edu.pk
[5]Associate Professor of Medicine, Liaquat University of Medical & Health Sciences Jamshoro,
Email: Kanwal.abbas@lumhs.edu.pk
[6]Assistant professor 0f Anatomy Indus Medical College TMK
Email: nayya.qazi990@gmail.com

***Corresponding Author**: Fahmida Gul
*Lecturer of Anatomy, Liaquat University of Medical & Health Sciences Jamshoro.
Email: fahmida.gul@lumhs.edu.pk

Abstract

Background: Preeclampsia a complex, unpredictable illness affecting multiple body systems, occurs in 10% of pregnancies worldwide and is the leading cause of maternal and perinatal morbidity and mortality, with the PIER score aiding in early detection.

Objective: To assess the morbidity and adverse outcomes of pre-eclamptic women using the fullPIERS risk prediction model.

Materials and Methods: This study was conducted at Liaquat University, involved 216 women with specific criteria were included after informed consent, using the PIERS calculator to assess the likelihood of negative outcome.

Results: Total 216 pre-eclampsia patients were involved, Out of these, 17% experienced adverse maternal outcome.

Conclusion: The fullPIERS calculator effectively predicted unfavorable maternal outcomes in females with preeclampsia based on their risk score.

Key Words: Risk prediction, Preeclampsia, Maternal outcomes, FullPIERS.

Introduction:

Preeclampsia is a complex disorder that affects over 10% of pregnancies globally, resulting in health issues and mortality for both the mother and the baby [1]. It can manifest in different ways, such as moderate hypertension, silent hypertension, neurological issues, renal problems, and heart

dysfunction [2]. Timely diagnosis and treatment are crucial factors for ensuring a successful pregnancy and postpartum outcome [3]. Improved monitoring, blood pressure control, and seizure prevention can help manage preeclampsia, but delivery is the only definitive solution [4]. The PIER score is a novel metric that assesses maternal symptoms, indications, and test data to forecast unfavorable maternal outcomes [5]. Preeclampsia is associated with gestational diabetes mellitus, hyperinsulinemia, and hypertension. The project intends to utilize this model to predict negative outcomes and enhance prompt intervention to decrease maternal and neonatal morbidity [6]. Risk factors include obesity, chronic hypertension, diabetes, renal disease, antiphospholipid syndrome, and previous preeclampsia, while hypertensive disorders during pregnancy include maternal age, obesity, hypertension history, and familial history [7].

Preeclampsia management in industrialized countries involves preconception counseling, perinatal blood pressure control, aspirin medication, betamethasone, parenteral MgSO4, and strict postpartum monitoring [9]. Effective treatment involves timely birth of the fetus and placenta, with expectant management for mild symptoms until 37 weeks. Severe cases can begin treatment at 34 weeks [10]. The fullPIERS model, was developed for 2023 women with late-onset preeclampsia, anticipates severe maternal complications within 48 hours of admission, facilitating timely clinical interventions. The model, developed for 2023 preeclampsia patients in advanced medical facilities in wealthy nations, demonstrated strong discriminatory ability with an AUROC [11].

Materials and Methods:
This descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynecology at Liaquat University of Medical and Health Sciences in Jamshoro after receiving ethical approval. Non-probability consecutive sampling method was applied.

Sample Selection:
Inclusion Criteria: Pregnant women with blood ressure of 140/90 or above, after 20 weeks of pregnancy urinary albumin 1+, preexisting HTN with accelerated HTN and newly developed proteinuria.

Exclusion Criteria: Pregnant women with unfavorable outcomes before meeting PIERS eligibility requirements or gathered predictive variables and if the patient attended a hospital during spontaneous labor.

Data Collection Procedure: All pregnant women who met the inclusion criteria were selected after informed consent. A comprehensive medical evaluation was conducted, which included a general systemic and obstetric examination. The investigation such as CBC, coagulation profile, RFTs, pulse oximetry, and fetal monitoring, including daily CTG, US, AFI assessment, and UAD fortnightly was carried out. The risk of a poor feto-maternal outcome was calculated using fullPIERS calculator. The data was collected using pre-designed Proforma. SPSS version 21.00 was utilized to assess all patient data.

Results: This research involved 216 pre-eclampsia patients, with a mean age of 24.8 years and a mean gestational age of 35.47 weeks. 54% were primiparous, 27.7% multiparous, and 18.3% grand multiparous. The most common symptoms were nausea, vomiting, headache, epigastric pain, chest pain, and visual disturbance. Other symptoms included platelet count, AST, creatinine, uric acid, dipstick proteinuria, and SpO2 levels. The patient's vital signs included a high percentage of oxygen saturation. This study categorized pre-eclampsia women based on fullPIERS score, with 19 women having low risk (8.8%), 50 having intermediate risk (23.14%), and 147 having high risk (68%). This study revealed that 18.3% of women experienced eclampsia, 1.8% had cortical blindness, and 3.2% had posterior reversible encephalopathy, 1.8% had SPO2 levels below 90% and 9.2% had acute renal

failure. Adverse outcomes were stratified based on baseline characteristics, residential status, mode of delivery, and FullPIERS score with respect to maternal symptoms and biomarkers. As shown in Table#1 and Table#2.

Discussion: The study by Agrawal S et al [12] evaluated the predictive power of the full PIERS model for unfavorable maternal outcomes in 17% of patients, aligning with previous research by Srivastava S et al [12] in which 18.3% and 16.8% of patients had unfavorable maternal outcomes, with 18.3% women, 1.8% having vision loss, 3.2% having reversible encephalopathy, 1.8% having SPO2 90%, and 9.2% having acute renal failure. Another study by Martin et al discovered that maternal symptoms, including visual disturbances, chest pain, epigastric pain, headache, nausea, and vomiting, is linked to poor maternal outcomes and higher maternal deaths, [13] which is corresponding our analysis revealed that visual disturbances, chest pain, dyspnea, and epigastric pain were the most common factors linked to poor maternal outcomes. Cavkaytar et al [14], found headache, vision problems, epigastric pain, and vomiting in HELLP condition to predict poor outcomes, while Yen et al [15] used PIERS trial data. They discovered that Preeclampsia symptoms in mothers are not always reliable indicators of poor maternal outcomes, so it's advisable to exercise caution when making treatment judgments based solely on symptoms. A systematic review found that serum uric acid is poorly predicted to predict maternal problems in preeclamptic women, with positive results predicting eclampsia with a pooled LR of 2.1. [16]. Hawkins et al [17] found uric acid content increases maternal and foetal outcomes, while our research suggests uric acid and creatinine are separate predictors of unfavorable outcomes.

Conclusion: The full PIERS calculator effectively anticipates adverse maternal outcomes in preeclamptic females, particularly in our state where women are more likely to experience morbidity and mortality from preeclampsia. Early detection can help doctors manage preeclamptic individuals and refer them to tertiary settings.

Table#1 Stratification of adverse outcome on the basis of FullPIERSscore with Baseline characteristics [n=216]

		Adverse Outcomes		
Baseline Data	**n [%]**	**Yes [n=37]**	**No [n=179]**	**P-value**
Age [Years]mean + SD	24.8 ± 2.9	24.5 ± 2.7	24.7 ± 2.8	0.45
Gestational Age[weeks] mean + SD	35.47 ± 3.55	35.43 ± 3.52	35.4 ± 3.3	0.9
Parity Primipara	117	16	101	
Multipara	60	14	46	
Grand Multipara	39	07	32	0.26
Booking Status				
Un-booked	160	25	135	
Booked	56	12	44	0.32
Residential Status				
Urban	41	05	36	
Rural	175	32	143	0.35
Mode of Delivery				
Vaginal	171	07	164	0.00
C-section	45	30	15	

Table #2 Stratification of adverse outcome on the basis of FullPIERSscore with respect to Maternal Symptoms Biomarkers [n=216]

Symptoms	**n [%]**		
		Yes [n=37]	**No [n=179]**
Headache	41	30	11
Visual Disturbances	19	14	05
Nausea and Vomiting	43	05	38
Epigastric Pain	26	18	08
Chest pain and/or dyspnea	26	18	08
Biochemical markers			
Platelet count [<1.5 lacs]	53	30	23
AST [>40 U/l]	80	35	45
Serum creatinine[>1.1 mg/dl]	52	28	24
Serum uric acid [>6 mg/dl]	37	22	15
Dipstick proteinuria [≥2]	150	80	70
SpO2			
< 90%	04	04	00
90 -93%	15	7	08
94-97%	121	13	108
>97%	112	13	99

References

1. Mayrink J, Costa ML, Cecatti JG. Preeclampsia in 2018: RevisitingConcepts, Physiopathology, and Prediction. Sci World J. 2018;2018.
2. Payne B, Hodgson S, Hutcheon JA, Joseph KS, Li J, Lee T, et al. Performance of the fullPIERS model in predicting adverse maternal outcomes in pre-eclampsia using patient data from the PIERS [Pre-eclampsia Integrated Estimate of Risk] cohort, collected on admission. BJOG An Int J Obstet Gynaecol. 2013;120[1]:1138.
3. Ukah UV, Payne B, Hutcheon JA, Ansermino JM, Ganzevoort W, Thangaratinam S, et al. Assessment of the fullPIERS risk prediction model in women with early-onset preeclampsia. Hypertension. 2018;71[4]:659–65.
4. Goswami P, Memon S ,Ujjan I et al Association Of Spiral Artery Remodeling And Vitamin D Receptors [Vdr] In Preeclampsia 2023; 10.53555/jptcp.v30i18.3334 .
5. Rebahi H, Still ME, Faouzi Y, El Adib AR. Risk factors for eclampsiain pregnant women with preeclampsia and positive neurosensory signs. Turk Jinekoloji ve Obstet Dern Derg. 2018;15[4]:227–34.
6. Ngwenya S, Jones B, Heazell AEP, Mwembe D. Statistical risk prediction models for adverse maternal and neonatal outcomes insevere preeclampsia in a low-resource setting:Proposal for a single-centre cross-sectional study at Mpilo Central Hospital, Bulawayo, Zimbabwe. BMC Res Notes. 2019;12[1]:1–11.
7. Thangaratinam S, Allotey J, Marlin N, Dodds J, Cheong-See F, von Dadelszen P, et al. Prediction of complications in early-onset pre- eclampsia [PREP]: Development and external multinational validation of prognostic models. BMC Med. 2017;15[1]:1–11.
8. Shehla S, Shazia T, Anam W, Hanif Q. Optimising preeclampsia first-trimester screening using three parameters. J Coll Physicians Surg Pak . 2023;33[9]:995–1000.
9. Onuh SO, Aisien AO. Maternal and fetal outcome in eclamptic patients in Benin City, Nigeria. J Obstet and Gynaecol. 2004;24[7]:765–68.

10. McClure EM, Saleem S, Pasha O, Goldenberg RL. Stillbirth in developing countries: a review of causes, risk factors and prevention strategies. J Matern Fetal Neonatal Med. 2009;22[3]:183–90.
11. U.Vivian, Ukah,Beth Payne,Jennifer et al Assessment of the fullPIERS Risk Prediction Model in Women With Early-Onset Preeclampsia.Hypertension. 2018;71:659–665
12. Agrawal S, Maitra N. Prediction of Adverse Maternal Outcomes inPreeclampsia Using a Risk Prediction Model. J Obstet Gynecol India. 2016;66[1]:104–11.
13. Martin JN Jr, May WL, Magann EF, Terrone DA, Rinehart BK, Blake PG. Early risk assessment of severe preeclampsia: admission battery of symptoms and laboratory tests to predict likelihood of subsequent significant maternal morbidity. Am J Obstet Gynecol. 1999;180:1407–
14. Cavkaytar S, Ugurlu EN, Karaer A, Tapisiz OL, Danisman N. Are clinical symptoms more predictive than laboratory parameters for adverse maternal outcome in HELLP syndrome? Acta Obstet Gynecol Scand. 2007;86:648-51.
15. Yen TW, Payne B, Qu Z, Hutcheon JA, Lee T, Magee LA, Walters BN, von Dadelszen P. Using clinical symptoms to predict adverse maternal and perinatal outcomes in women with preeclampsia: data from the PIERS [pre-eclampsia integrated estimate of risk] study. J Obstet Gynaecol Can. 2011;33[8]:803- 9.
16. Kozic JR, Benton SJ, Hutcheon JA. Abnormal liver function tests as predictors of adverse maternal outcomes in women with preeclampsia. J Obstet Gynaecol Can. 2011;33[10]:995–1004.
17. Hawkins T, Roberts J, Mangos G. Plasma uric acid remains a marker of poor outcome in hypertensive pregnancy: a retrospective cohort study. BJOG. 2012;119:484