Section: Obstetrics and Gynaecology

Original Research Article

PREGNANCY-RELATED ACUTE KIDNEY INJURY: THE DYNAMIC PANORAMA FOR THE 21ST CENTURY - A RETROSPECTIVE STUDY

Renu Chaudhary[1], *Shakun Singh*[2]

[1]*Assistant Professor, Department of Obstetrics and Gynaecology, LLRM Medical College, Meerut, Uttar Pradesh, India*
[2]*Professor, Department of Obstetrics and Gynaecology, LLRM Medical College, Meerut, Uttar Pradesh, India*

Received *: 29/03/2025*
Received in revised form *: 22/05/2025*
Accepted *: 11/06/2025*

Corresponding Author:
Dr. Renu Chaudhary,
Assistant Professor, Department of Obstetrics and Gynaecology, LLRM Medical College, Meerut, Uttar Pradesh, India
Email: doctorrenu92@gmail.com

DOI: 10.70034/ijmedph.2025.2.432

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2025; 15 (2); 2391-2398

ABSTRACT

Background: The objective is to evaluate the clinical characteristics, risk factors, and outcomes of Pregnancy-Related Acute Kidney Injury (PRAKI) in a cohort of 71 pregnant individuals, focusing on associations between renal conditions and mortality, dialysis requirements, and spontaneous recovery. Design is retrospective observational cross-sectional study. Setting is conducted at the Department of Obstetrics and Gynecology, Lala Lajpat Rai Medical College, Meerut, associated with S.V.B.P. Hospital for 1 year January 2023 to January 2024 collected retrospectively. Population or Sample is pregnant women presenting with PRAKI during antepartum, intrapartum, or postpartum periods, meeting specific diagnostic criteria for acute kidney injury.

Materials and Methods: Data collection encompassed demographic details, obstetric history, clinical manifestations, laboratory parameters, imaging findings, management strategies, and maternal-fetal outcomes. Statistical analyses examined associations between renal causes and outcomes, including mortality, dialysis requirement, and spontaneous recovery. Main Outcome Measures is prevalence and impact of PRAKI phases (onset, anuric, diuretic), hypertensive disorders, anemia, and hemorrhagic conditions on maternal and fetal outcomes.

Results: The onset phase was the most common renal condition (25.4%), followed by anuria (21.1%). Severe anemia (49.3%) and eclampsia (28.2%) emerged as significant risk factors. Chi-square analyses showed significant associations between renal phases and spontaneous recovery ($p=0.004$), mortality ($p<0.001$), and dialysis requirements ($p<0.001$). Early hemorrhagic conditions such as ectopic pregnancy and hemoperitoneum significantly contributed to PRAKI onset.

Conclusion: Early detection, antenatal care, and multidisciplinary management are critical to improving PRAKI outcomes. Targeted interventions, such as routine renal function screening and anemia management, are recommended to mitigate risks and enhance maternal-fetal health.

Keywords: Pregnancy, Kidney, Anemia, Hypertensive, Hemorrhage.

INTRODUCTION

Acute kidney injury (AKI) is a major "contributor to maternal and fetal mortality and morbidity, and it is a public health concern during pregnancy".[1] In addition, AKI leading to CKD and ESKD, an increased risk of unfavorable cardiovascular events, greater healthcare utilization, and lengthier hospital admissions are all related with AKI. Hence, it is crucial to identify and treat AKI in pregnancy as soon as possible; doing so might save lives.[2,3]

In developed countries, "the incidence of AKI during pregnancy is low" because of better prenatal care. However, in the United States, the rates have almost tripled in the last decade. This could be due to a number of factors, including a higher rate of AKI identification, more hypertensive disorders of pregnancy, greater obesity, and older mothers with more comorbidities.[4] Among women "in the United

States between the ages of 15 and 49, a recent study found 42,190,790" hospitalizations due to pregnancy. The risk of acute kidney injury (AKI) during these hospitalizations increased from 0.04% in 2006 to 0.12% in 2015.[5] The incidence of AKI in pregnancy increased from "2.4 per 10,000 births in 1999-2001 to 6.3 per 10,000 deliveries in 2010-2011".[6] On the other hand, despite a general decline in AKI during pregnancy in developing nations in recent years, the prevalence of this condition is still greater than in industrialized nations. This is mainly attributable to a lack of prenatal care and an increase in the number of septic abortions. Take India as an example. "The rate of AKI during pregnancy" among hospitalized women decreased from 15% in the 1980s to 1.5% in the 2010s.[1] As prenatal and postnatal treatment have improved, the prevalence of PR-AKI has decreased from 7% to 4.68% between 2000 and 2014.[7] Among pregnant women in India, the frequency of AKI varied between 0.02 and 11.5%.[8]

The PR-AKI scene is changing as we entering the 21st century because to factors like as new medical technologies, shifting demography, and a better knowledge of the pathophysiological mechanisms at action.[9] The detection rates, hospital delivery rates, and the frequency of high-risk pregnancies have all been on the rise, which has led to an increase in the incidence of PR-AKI. The growing prevalence of comorbidities such as hypertension and diabetes, as well as an older mother population, all add to the burden of PR-AKI. Improving outcomes through interdisciplinary methods, newer medicines, and increased prenatal care is a fresh opportunity that the 21st century presents, despite these limitations.[10] "For early detection and management, it is essential" to understand the risk factors for PR-AKI. Recognized "causes of PR-AKI include preeclampsia, sepsis," and acute fatty liver of pregnancy. New evidence, however, points to the possibility that environmental variables and genetic predispositions may play a role. Improved maternal and fetal outcomes are possible when healthcare practitioners recognize and treat these risk factors. From completely asymptomatic individuals to those with significant renal impairment necessitating dialysis, the clinical presentation of PR-AKI might differ greatly. The development of chronic kidney disease and its subsequent consequences can be averted with prompt diagnosis and treatment. Stabilizing the patient, addressing the root cause, and avoiding more kidney damage are the current goals of care. In order to optimize treatment and guarantee the best potential results for mother and baby, multidisciplinary teams consisting of nephrologists, obstetricians, and neonatologists are crucial. Looking ahead, there is hope for better PR-AKI diagnosis and therapy because to continuing research and technological developments. Our understanding of PR-AKI is being enhanced and clinical decision-making is being guided by the development of novel biomarkers, imaging methods, and therapeutic interventions. Reducing the worldwide burden of PR-AKI and guaranteeing equitable care for all pregnant women requires initiatives to increase healthcare access, especially in low-resource settings.[11]

Aim and objective

The study provides insights into the contemporary profile of PRAKI, facilitating enhanced risk stratification, timely interventions, and improved maternal-fetal outcomes in high-risk pregnancies.

- To find association between renal causes and recovered by itself.
- To find association between renal causes and recovered by mortality.
- To find association between renal causes and recovered by dialysis.

MATERIALS AND METHODS

Place of study-present study will be conducted in the "department of obstetrics and gynecology Lala Lajpat Rai medical college" associated with "S.V.B.P hospital Meerut for a period of 1 year and data" will be collected retrospectively.

Type of study: Observational retrospective cross-sectional study.

Approval: approval from the institutional ethics committee will be taken.

Study population and sample size

All pregnant women with the life threatening conditions that cause PRAKI presenting "with acute kidney injury (AKI) during the antepartum, intrapartum, or postpartum period." Data collection included demographic characteristics, obstetric history, underlying etiological factors, clinical manifestations, laboratory parameters, imaging findings, management strategies, and maternal-fetal outcomes. The multifactorial nature of PRAKI necessitates a holistic approach encompassing preconception counseling, antenatal surveillance, timely intervention, and postpartum follow-up. Collaborative efforts between obstetricians, nephrologists, intensive care unit team, and neonatologists are imperative for optimizing maternal-fetal outcomes in PRAKI.

Inclusion criteria

Pregnant women who were included in the study were those who were healthy previously and had developed acute kidney injury-

1. Increase in serum creatinine ≥0.3mg/dl within 48 hrs.
2. Increase in serum creatinine ≥1.5 times from baseline
3. Oliguria (urine output<0.5 ml/kg/hr.) for 6 hrs and Due to pregnancy related complications.

Exclusion criteria

1. Evidence of renal disease prior to pregnancy.
2. History of renal stone disease and end stage ren
3. Elevated serum creatinine prior to gestation.

RESULTS

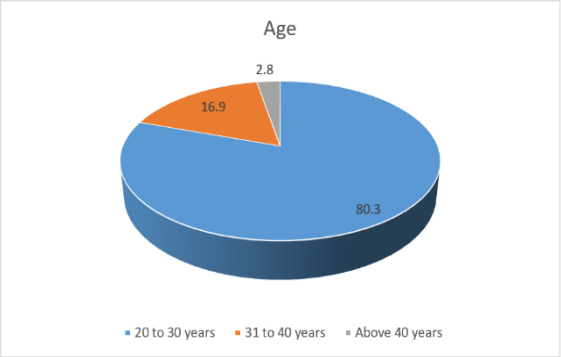

Figure 1: Age wise distribution of participants

The results section offers a thorough examination of the study's findings, highlighting the associations between renal causes and other clinical outcomes among the patients.

The figure above illustrates the age distribution of patients, comprising 80.3% in the 20 to 30 years age group, "16.9% in the 31 to 40 years age group, and 2.8% in the above 40 years age group."

Women who have experienced gravida 1 (first-time pregnancies) constitute the largest category, comprising 36.6% (26 out of 71) of the sample. The participants' most common pregnancy is a first-time pregnancy, as this suggests. Gravida 2 (second pregnancies) is the second-largest category, with 23.9% of the total (17 out of 71) women. Third pregnancies are represented by 21.1% of women (15 out of 71). The proportion of women with gravida 4 is 14.1% (10 out of 71). The prevalence of gravida 5 and gravida 6 is relatively low, with only 2.8% (2 out of 71) and 1.4% (1 out of 71) of women respectively.

Table 1: Distribution of gravida in Patients associated with AKI.

Gravida		
	Frequency	**Percent**
1.00	26	36.6
2.00	17	23.9
3.00	15	21.1
4.00	10	14.1
5.00	2	2.8
6.00	1	1.4
Total	71	100.0

Table 2: Mode of delivery

Mode of delivery		
	Frequency	**Percent**
1ST POD LSCS	1	1.4
ANC	2	2.8
EXP LAP F/B REPAIR OF UTERUS	1	1.4
EXP LAP F/B REPAIR OF UTERUS F/B INTERNAL ILIAC LIGATION	1	1.4
LSCS	20	28.2
OBS HYSTERCTOMY WITH INTERNAL ILIAC LIGATION	1	1.4
OBS HYSTERECTOMY	10	14.1
OBS HYSTERECTOMY WIITH RIGHT BROAD LIG HAEMATOMA	1	1.4
OBS HYSTERECTOMY WITH INTERNAL ILIAC LIGATION	1	1.4
POST NATAL	2	2.8
Post op day 1 LSCS	2	2.8
Post op day 3 LSCS	1	1.4
VD	28	39.4
Total	71	100.0

The table provides the frequency and percentage distribution of the mode of delivery among 71 participants. Vaginal Delivery (VD) is the most frequent mode, accounting for 39.4% (28 out of 71) of cases. Lower Segment Cesarean Section (LSCS) was the next most common mode, comprising 28.2% (20 out of 71). Cases involving obstetric hysterectomy (removal of the uterus due to complications) totaled 14.1% (10 out of 71). Exploratory Laparotomy followed by Repair of Uterus and associated procedures (e.g., internal iliac ligation), each accounting for 1.4%. Specific post-operative cases (e.g., post-op day 1 and day 3 LSCS) were also rare, at 1.4% to 2.8%. Antenatal (ANC) and postnatal care cases comprised 2.8% (2 out of 71).

Table 3: Association of Early Haemorrahge with PRAKI

Early haemorrahge		
	Frequency	**Percent**
Ectopic preg	7	9.9
Haemoperitoneum	3	4.2
Total	10	14.1

The table outlines the frequency and percentage of cases of early hemorrhage among 71 participants. Ectopic pregnancy (a pregnancy occurring outside the uterus, often in the fallopian tube) accounts for

the majority of early hemorrhage cases, with 7 out of 71 cases. (9.9%). Hemoperitoneum (accumulation of blood in the peritoneal cavity, often due to rupture or trauma) was observed in 3 out of 71 cases (4.2%).

Table 4: percentage of APH cases causes PRAKI

APH		
	Frequency	**Percent**
PP	14	19.7
AP	12	16.9
Total	26	36.6

The table provides the frequency and percentage distribution of Antepartum Hemorrhage (APH) cases among 71 participants. Placenta Previa accounts for 19.7% (14 out of 71) of the cases. Abruption Placentae, where the placenta detaches from the uterine wall prematurely, constitutes 16.9% (12 out of 71).

Table 5: Percentage of PPH cases causes PRAKI

PPH		
	Frequency	**Percent**
Atonic PPH	1	1.4
Atonic PPH and atonic PPH	1	1.4
PAS	6	8.5
RUP UT	11	15.5
Total	19	26.8

The table outlines the frequency and percentage of cases of Postpartum Hemorrhage (PPH) among 71 participants. Atonic PPH (failure of the uterus to contract after delivery) accounts for 1.4% (1 out of 71). Another category labeled Atonic PPH and Atonic PPH also contributes 1.4% (1 out of 71). PAS, involving abnormal adherence of the placenta to the uterine wall, constitutes 8.5% (6 out of 71) of cases. Ruptured uterus, a life-threatening complication where the uterine wall tears during pregnancy or delivery, accounts for 15.5% (11 out of 71) of cases.

Table 6: percentage of HDP cases among PRAKI patients

HDP		
	Frequency	**Percent**
Eclampsia	20	28.2
Pre ecl	19	26.8
Seizure	1	1.4
Total	40	56.3

The table provides the frequency and percentage distribution of Hypertensive Disorders of Pregnancy (HDP) among 71 participants. Eclampsia is the most frequent HDP in this study, accounting for 28.2% (20 out of 71) of cases. Pre-eclampsia, a precursor to eclampsia involving high blood pressure and signs of organ damage, is observed in 26.8% (19 out of 71) of participants. Seizure, unrelated to pre-eclampsia or eclampsia, was noted in 1.4% (1 out of 71).

Table 7: Percentage of Anaemia cases among PRAKI patients

Anaemia		
	Frequency	**Percent**
Mild	3	4.2
Moderate	31	43.7
Severe	35	49.3
Shock	2	2.8
Total	71	100.0

The table summarizes the severity levels of anemia among 71 participants. Severe anemia is the most prevalent, affecting 49.3% (35 out of 71) of participants. Moderate anemia is observed in 43.7% (31 out of 71) of cases. Mild anemia affects only 4.2% (3 out of 71) of participants. Shock, a rare but life-threatening complication, was reported in 2.8% (2 out of 71) of participants.

Table 8: Phases of AKI

AKI		
	Frequency	**Percent**
Adequate phase	12	16.9
Anuria phase	27	38.02
Diuretic phase	7	9.8
Oliguria phase	7	9.8

Onset phase	18	25.3
Total	71	100.0

The table categorizes phases of AKI experienced by 71 participants. The Onset phase is the most frequently observed, occurring in 25.4% (18 out of 71) of cases. Anuria phase (complete lack of urine production) is reported in 38.02%(27 out of 71) of cases. Adequate renal function is reported in 16.9% (12 out of 71) of pateints. The Diuretic phase, seen in 9.9% (7 out of 71). Oliguria (reduced urine output) is observed in 9.8% (7out of 71), while Adequate urine output Reported in factors causes causing PAKI 16.9% (12 out of 71).

Table 9: Association between renal cause and recovered by itself

Renal cause * Recovered by itself				
Count				
		Recovered by itself		**Total**
		Recovered	**Not recovered**	
Renal cause	Adequate	0	12	12
	Anuria	9	18	27
	Diuretic phase	2	5	7
	Oliguric phase	2	5	7
	Onset phase	6	12	18
Total		19	52	71
Chi-Square Tests				
	Value	**df**	**Asymp. Sig. (2-sided)**	
"Pearson Chi-Square"	20.682a	7	.004	
"Likelihood Ratio"	25.595	7	.001	
"Linear-by-Linear Association"	.909	1	.340	
"N of Valid Cases"	71			
a. "11 cells (68.8%) have expected count less than 5. The minimum expected count is .27."				

Chi square value = 20.682, df = 7, p = 0.004. The p-value (< 0.05) indicates a statistically significant association between the type of renal cause and whether recovery occurred by itself. This means the renal cause plays a role in determining the likelihood of spontaneous recovery.

Table 10: acute kidney injury v/s mortality

Renal cause * Mortality				
Count				
		Mortality		**Total**
		Live	**Expired**	
Renal cause	Adequate	12	0	12
	Anuria	15	12	27
	Diuretic phase	7	0	7
	Oliguric phase	3	4	7
	Onset phase	17	1	18
Total		54	17	71
Chi-Square Tests				
	Value	**df**	**Asymp. Sig. (2-sided)**	
"Pearson Chi-Square"	58.492a	7	.000	
"Likelihood Ratio"	62.799	7	.000	
"Linear-by-Linear Association"	.226	1	.635	
"N of Valid Cases"	71			
a. "11 cells (68.8%) have expected count less than 5. The minimum expected count is .24."				

Chi square value = 58.492, df = 7, p = 0.000. The p-value (< 0.05) indicates a statistically significant association between the type of renal cause and mortality. This confirms that certain renal causes have higher mortality risks.

Table 11: Association between renal cause and Req. for dialysis

Renal cause * req for dialysis				
Count				
		req for dialysis		**Total**
		Dialysis	**No dialysis**	
Renal cause	Adequate	0	12	12
	Anuria	12	15	27
	Diuretic phase	0	7	7
	Oliguria	1	6	7
	Onset phase	0	18	18
Total		13	58	71
Chi-Square Tests				

	Value	df	Asymp. Sig. (2-sided)
"Pearson Chi-Square"	32.000a	7	.000
"Likelihood Ratio"	32.285	7	.000
"Linear-by-Linear Association"	3.846	1	.050
"N of Valid Cases"	71		
a. "11 cells (68.8%) have expected count less than 5. The minimum expected count is .18."			

The Pearson Chi-Square value is 32.000, and the p-value is 0.000, which is less than the significance level of 0.05. This indicates a statistically significant association between renal cause and the requirement for dialysis.

DISCUSSION

The present investigation indicates that the majority of participants (80.3%) are between the ages of 20 and 30, with only 2.8% exceeding the age of 40. (Mahesh et al., 2017),[12] also reported that one hundred and sixty-five patients met the criteria for PRAKI, with the majority of the patients being between the ages of 21 and 25 (66%). Our study results suggest that 36.6% of cases are first-time pregnancies (gravida 1). While a study conducted by (Shah & Verma, 2023).[13] "During the first trimester of pregnancy," AKI is frequently reported as a secondary condition to pre-renal AKI caused by dehydration from hyperemesis gravidarum. According to this investigation, Vaginal Delivery (VD) was the most prevalent method (39.4%), with Lower Segment Cesarean Section (LSCS) following at 28.2%. These findings are consistent study done by (Sachan et al., 2022),[14] 56.0% of patients "delivered vaginally, 40% underwent a cesarean section, 1.3% required a laparotomy or hysterectomy," and 4 (2.7%) patients underwent an abortion. In our study, Ectopic pregnancies were responsible for 9.9% of early hemorrhage cases, according to a study conducted by Chen and Huang (2017),[15] The primary cause of acute kidney injury "(AKI) during the first semester of pregnancy was hemorrhagic shock from a ruptured ectopic pregnancy." No septic abortions were reported. In our study, 26.8% of cases, postpartum hemorrhage was reported, with uterine rupture a significant contributing factor (15.5%). Similar findings were observed by Mir et al,[16] (2017) in 25% cases of postpartum hemorrhage (PPH). In our study, Hypertensive disorders (56.3%) were predominantly eclampsia (28.2%) and preeclampsia (26.8%) reported while a study by (Shapiro et al., 2022),[17] found "1.7% were associated with gestational hypertension and 4.4% with preeclampsia." In our study, Severe anemia was prevalent in 49.3% of participants which is similar as (Chauhan et al., 2022),[18] "About 49.9% of subjects had severe anemia." The study identified the onset phase (25.4%) and anuria (21.1%) as the most frequent renal conditions. While other study (Chauhan et al., 2022),[18] also identified at presentation, 23.5% of patients had anuria and 33.3% oliguria. "Oliguria was also the commonest symptom in the studies conducted by other authors" like (Kabbali et al., 2015),[19] "reported 57% of patients had oliguria. Oliguria was reported in 39% patients with AKI" "in a study conducted by (Arrayhani et al., 2013),[20] and (Ansari et al., 2008),[21] "found anuria in 45% of the patients." The results indicate a statistically significant association between the type of renal cause and whether recovery occurred spontaneously (Chi-square = 20.682, p = 0.004). This implies that the specific renal condition significantly influences the likelihood of natural recovery. Onset phase cases had the highest proportion of recovery by itself compared to other phases, suggesting that early interventions or milder conditions may play a role in self-resolution. Anuric phase showed no recovery without external intervention. The association between renal causes and mortality was highly significant (Chi-square = 58.492, $p < 0.001$). The anuric phase had the highest mortality rate, reflecting its critical nature and poor prognosis if not addressed promptly. Onset phase cases had the lowest mortality rates, further supporting the need for early detection and treatment. The requirement for dialysis showed a significant association with renal causes (Chi-square = 32.000, $p < 0.001$).

Main Findings: This study emphasises the evolving nature of Pregnancy-Related Acute Kidney Injury (PRAKI) and its related maternal and fetal consequences. The onset phase was the most commonly reported renal state (25.4%), but anuria and the anuric phase were associated with the greatest death rates. Severe anaemia (49.3%) and hypertensive diseases, especially eclampsia (28.2%), were major factors to PRAKI. Statistical studies demonstrated significant correlations between renal phases and outcomes, including spontaneous recovery ($p=0.004$), death ($p<0.001$), and dialysis needs ($p<0.001$). Hemorrhagic disorders, including ectopic pregnancy and placental abnormalities, intensified the severity of PRAKI.

Strengths:

- Comprehensive examination of PRAKI utilising a clearly defined cohort with extensive demographic, clinical, and laboratory data.
- Utilisation of statistical analysis to determine significant correlations between renal diseases and clinical outcomes.
- Focus on interdisciplinary strategies to enhance maternal and fetal outcomes.

Limitations:

- The retrospective design limits causal inference.
- Single-center study may reduce generalizability to other settings.
- Lack of long-term follow-up data on maternal and fetal outcomes.

- Limited exploration of environmental and genetic risk factors contributing to PRAKI.

Interpretation

The results highlight the essential requirement for early identification and management of PRAKI via regular prenatal monitoring, particularly in high-risk pregnancies. Severe anaemia and hypertensive diseases require specific therapies to reduce consequences. The significant correlation between renal stages and outcomes underscores the necessity of prompt therapies during the onset phase. Multidisciplinary approach that includes nephrologists, obstetricians, and critical care experts is essential for enhancing prognoses.

CONCLUSION

Acute renal injury (PRAKI) during pregnancy is a major health concern "for both the mother and the unborn child." The clinical parameters, results, and related problems of PRAKI were thoroughly examined "in this study, which included a cohort of pregnant women." Not only do the results show important trends, but they also provide practical advice for easing the PRAKI load. Several underlying factors, including hypertensive diseases, anemia, and stages of renal failure, were shown to impact PRAKI, according to the study. With 25.4% of women affected, the onset phase was the most common renal cause. The most difficult symptoms, including anuria (total absence of urine output) and the anuric phase, were associated with a greater risk of death and the need for dialysis. Results like death and dialysis needs were shown to be statistically associated with renal causes. The severe prognosis of the anuric phase was highlighted by its tight association with death. Anuric and oliguric disorders, characterized by decreased or nonexistent urine production, were most frequently linked to the necessity of dialysis. The most common hypertension condition, with 28.2% of cases, was eclampsia, which is marked by seizures and organ failure. About 50% of those who took part in the study suffered from severe anemia. An important public health concern is brought to light by the high incidence of moderate to severe anemia among the participants. In addition to raising the risk of PRAKI, the presence of severe anemia in 49.3% of participants made it more difficult to address pregnancy-related problems. Ectopic pregnancies and placental anomalies are examples of hemorrhagic disorders that had a major role in the development of PRAKI. The urgency of surgical and medicinal procedures in cases of early hemorrhages, such as hemoperitoneum and ectopic pregnancies, has been brought to light in order to avert additional difficulties. Analyses of statistical data showed that different renal causes had different probabilities of spontaneous recovery. The likelihood of avoiding dialysis was best during the diuretic phase and when renal function was adequate.

Suggestions

- It is important to promote thorough and frequent prenatal exams that aim to identify risk factors like as hypertension, anemia, and indications of renal impairment in their early stages.
- The successful management of PRAKI patients requires a joint effort by critical care teams, nephrologists, and obstetricians.
- Healthcare providers and pregnant women can be better prepared to respond quickly if they are educated on the signs and symptoms of PRAKI.
- Medical centers in areas with limited resources should have more advanced diagnostic equipment and trained staff to handle PRAKI cases.
- Making sure people can easily access dialysis centers and critical care units should be a top priority for policymakers when it comes to PRAKI prevention and management.
- In order to stop chronic kidney disease (CKD) from progressing, it is important to check for any long-term renal problems during postpartum follow-up treatment.
- Improving PRAKI management techniques and developing intervention plans requires ongoing study and the collection of data particular to regions.

REFERENCES

1. Rao S, Jim B. Acute Kidney Injury in Pregnancy: The Changing Landscape for the 21st Century. Kidney International Reports. 2018.
2. Chawla LS, Amdur RL, Shaw AD, Faselis C, Palant CE, Kimmel PL. Association between AKI and long-term renal and cardiovascular outcomes in united states veterans. Clin J Am Soc Nephrol. 2014;
3. Thakar C V., Christianson A, Himmelfarb J, Leonard AC. Acute kidney injury episodes and chronic kidney disease risk in diabetes mellitus. Clin J Am Soc Nephrol. 2011;
4. Gonzalez Suarez ML, Kattah A, Grande JP, Garovic V. Renal Disorders in Pregnancy: Core Curriculum 2019. American Journal of Kidney Diseases. 2019.
5. Shah S, Meganathan K, Christianson AL, Harrison K, Leonard AC, Thakar C V. Pregnancy-Related Acute Kidney Injury in the United States: Clinical Outcomes and Health Care Utilization. Am J Nephrol. 2020;
6. Mehrabadi A, Dahhou M, Joseph KS, Kramer MS. Investigation of a rise in obstetric acute renal failure in the United States, 1999-2011. Obstet Gynecol. 2016;
7. Prakash J, Pant P, Prakash S, Sivasankar M, Vohra R, Doley PK, et al. Changing picture of acute kidney injury in pregnancy: Study of 259 cases over a period of 33 years. Indian J Nephrol. 2016;
8. Gopalakrishnan N, Dhanapriya J, Muthukumar P, Sakthirajan R, Dineshkumar T, Thirumurugan S, et al. Acute kidney injury in pregnancy-a single center experience. Ren Fail. 2015;
9. Berhe E, Teka H, Abraha HE, Abera BT, Gebru MA, Gebremariam T, et al. Characteristics and outcome of pregnancy-related acute kidney injury in a teaching hospital in a low-resource setting: a five-year retrospective review. BMC Nephrol [Internet]. 2024 May 22;25(1):182. Available from: https://bmcnephrol.biomedcentral.com/articles/10.1186/s12882-024-03616-9
10. Scurt FG, Morgenroth R, Bose K, Mertens PR, Chatzikyrkou C. Pr-AKI: Acute Kidney Injury in Pregnancy - Etiology, Diagnostic Workup, Management. Geburtshilfe und Frauenheilkunde. 2022.
11. Vinturache A, Popoola J, Watt-Coote I. The changing landscape of acute kidney injury in pregnancy from an obstetrics perspective. Journal of Clinical Medicine. 2019.

12. Mahesh E, Puri S, Varma V, Madhyastha PR, Bande S, Gurudev KC. Pregnancy-related acute kidney injury: An analysis of 165 cases. Indian J Nephrol. 2017;
13. Shah S, Verma P. Pregnancy-Related Acute Kidney Injury: Do We Know What to Do? Nephron. 2023.
14. Sachan R, Shukla S, Shyam R, Sachan PL, Patel ML. Feto-maternal outcome of pregnancy related acute kidney injury in a North Indian population. J Fam Community Med. 2022;
15. Huang C, Chen S. Acute kidney injury during pregnancy and puerperium: a retrospective study in a single center. BMC Nephrol. 2017;
16. Mir MM, Najar MS, Chaudary AM, Azad H, Reshi AR, Banday KA, et al. Postpartum acute kidney injury: Experience of a tertiary care center. Indian J Nephrol. 2017;
17. Shapiro J, Ray JG, McArthur E, Jeyakumar N, Chanchlani R, Harel Z, et al. Risk of Acute Kidney Injury After Hypertensive Disorders of Pregnancy: A Population-Based Cohort Study. Am J Kidney Dis. 2022;
18. YADAV S, CHAUHAN M, JAIN D, AGGARWAL HK, YADAV RK. Renal Outcomes of Pregnancy-Related Acute Kidney Injury: a Single Centre Experience in India. Maedica - A J Clin Med [Internet]. 2022 Mar 15;17(1). Available from: https://www.maedica.ro/articles/2022/1/2022_17(20)_No1_pg80-87.pdf
19. Kabbali N, Tachfouti N, Arrayhani M, Harandou M, Tagnaouti M, Bentata Y, et al. Outcome assessment of pregnancy-related acute kidney injury in Morocco: A national prospective study. Saudi J Kidney Dis Transplant. 2015;
20. Arrayhani M, El Youbi R, Sqalli T. Pregnancy-Related Acute Kidney Injury: Experience of the Nephrology Unit at the University Hospital of Fez, Morocco. ISRN Nephrol. 2013;
21. Ansari MR, Laghari MS, Solangi KB. Acute renal failure in pregnancy: One year observational study at Liaquat University Hospital, Hyderabad. J Pak Med Assoc. 2008.