

# ACUTE RENAL PROBLEMS STILL A GREAT CHALLENGE IN OBSTETRICS

## ABSTRACT

**Objective:** To assess the early risk factors and outcomes of the patients presented with acute renal issues, at tertiary care Hospital.

**Methodology:** This descriptive study was conducted at gynaecology and obstetrics department of Liaquat University of medical and health Sciences. Study duration was one year from 2017 to 2018. Women having age more than 18 years, developed renal impairment as serum creatinine level more than 1.2mg/dl were included. All data was collected via self-made proforma. SPSS version 20 was used for the data analysis.

**Results:** Total 58 women having renal problems during pregnancy were studied, their mean age was  $28.40 \pm 4.68$  years and mean gestational age was  $28.40 \pm 4.68$  years. Most of the women 70.2% were un-booked. Parity 1-3 was commonest.

Anaemic women were on high risk of renal impairment as most of the patients had moderate anemia. Hypertension was in 35.1% patients, placental abruption was in 10.5% cases, two patients had diabetes, 12.3% presented with pregnancy induced hypertension and postpartum haemorrhage was in 05.3% cases. There was a significant negative correlation between haemoglobin level and serum creatinine level, creatinine (r-value 0.029).

**Conclusion:** Anemia was the commonest reason for renal impairment during pregnancy. Most of the women were un-booked, having high parity and were presented with anemia. This morbidity can be decreased and prevented by stabilizing the haemoglobin level by taking proper antenatal care.

**Key words:** Creatinine, challenge, obstetrics, anemia

## INTRODUCTION

Acute kidney injury (AKI) itself is a known clinical condition defined by a rapid reduction in the rate of glomerular filtration resulting in decline in the excretion of the nitrogenous wastes such as creatinine, urea and further uremic pollutants. In early pregnancy, obstetric AKI commonly results from septic abortions as well as by postpartum hemorrhage, antepartum hemorrhage, pregnancy toxemia and late pregnancy HELLP syndrome.<sup>1,2</sup> It is a complex multi-etiology involving condition that can take place during pregnancy and at postpartum periods at any time. It is a serious obstetric complication associated with severe foetomaternal mortality and morbidity.<sup>3</sup> The incidence has declined due to improvements in reproductive health but it is still

correlated with significant perinatal mortality and maternal morbidity.<sup>4</sup> It may be due to ischemic tubular necrosis or decline in renal perfusion from various conditions encountered during pregnancy.<sup>4</sup> Major PRAKI factors involving hypertensive conditions during pregnancy, sepsis, obstetric hemorrhage, acute fatty liver and thrombotic microangiopathy during pregnancy,<sup>5</sup> and freshly reported 10.55% incidence of postpartum AKI (PP-AKI) along with sepsis and haemorrhage being the most common etiologies.<sup>4,6</sup> Acute renal failure poses a high risk for bilateral cortical necrosis of kidney in pregnancy and thus of chronic kidney dysfunction.<sup>7</sup> Cortical necrosis of kidney is a rare phenomenon and is responsible for just 2% of all ARF events.<sup>7</sup> In normal pregnancy, substantial variations occur within urinary tract: because of interstitial and renal vascular space size expansions, the kidneys volume raised by around 1-1.5 cm.<sup>8</sup> More than 90% of pregnant females undergo physiological hydronephrosis marked by dilation of ureter, calyces, and renal pelvis.<sup>8,9</sup> Upto the 16th week postpartum, this anatomical irregularity could be functional and induces urinary stasis within ureter, contributing to urinary tract infection development.<sup>8</sup> Pregnancy associated acute kidney injuries are still common in developed countries; and its incidence there varies considerably from one country to the other and within the same country, from one region to the other.<sup>10</sup> Many national and international studies showed different responsible factors and incidence of acute renal problems as in a local recent study observed that postpartum haemorrhage (PPH) in addition to Sepsis is the leading factors for Pregnancy associated acute kidney problems.<sup>11</sup> Another study observed puerperal sepsis was the most common etiological cause of pregnancy-related acute kidney injury.<sup>12</sup> This study has been conducted to evaluate the risk factors of acute renal problems and outcome at tertiary care Hospital.

## **MATERIALS AND METHOD**

This descriptive study was performed in the department of gynaecology and obstetrics of Liaquat University of medical and health Sciences. Study duration was one year from 2017 to 2018. All the women having age more than 18, developed renal impairment as serum creatinine level more than 1.2mg/dl were included. Patients those were already known regarding renal problems before the pregnancy, history of diabetes mellitus and hypertension were excluded. All of the partaking patients enrolled following informed consent. Complete clinical examination including blood pressure and required laboratory investigation were done. Patients were interviewed regarding age, parity, booking status, socioeconomic status and residential status. After taking informed consent a 5ml blood sample was taken from each patient to assess the haemoglobin level, serum creatinine level, blood urea and uric acid level. Anemia was defined as normal = haemoglobin level >11g/dl, mild= haemoglobin level 9-10.9g/dl, moderate haemoglobin level 7-8.9g/dl and severe haemoglobin level <7 g. All data was collected via self-made proforma. SPSS version 20 was used for the data analysis.

## RESULTS

Total 58 women having renal problems during pregnancy were studied, their mean age was  $28.40 \pm 4.68$  years and mean gestational age was  $28.40 \pm 4.68$  years. Most of the women 70.2% were un-booked and 29.8% were booked. Edema was seen in 21.1% of the patients. Most of the women had parity 1-3 followed by 15.8% were nulliparous, 24.6% had parity 4-6 and only 03.5% had parity more than 6. Majority of the patients had poor and middle socioeconomic status as 29.8% and 59.6% respectively. Table.1.

According to the risk factors anaemic women were on high risk of renal impairment as most of the patients had moderate anemia. Hypertension was seen in 35.1% patients, abruption was in 10.5% cases, tow patients had diabetes, 12.3% presented with pregnancy induced hypertension and postpartum haemorrhage was in 05.3% cases. Table.2

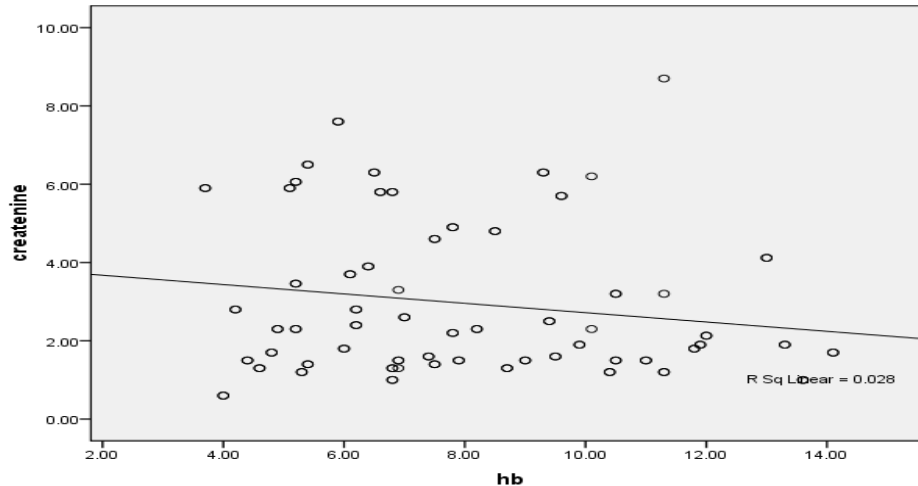
There was a significant negative correlation between haemoglobin level and serum creatinine level, creatinine (r-value 0.029) and (p-0.058). Fig.1

Table:1. Showed the demographic characteristics of the patients n=58

Variables		Frequency	Percent
Booking status	Booked	17	29.8
	Un-booked	40	70.2
Edema	Yes	12	21.1
	No	45	78.9
Parity	00	09	15.8
	1-3	32	56.1
	4-6	14	24.6
	>6	02	03.5
Socioeconomic status	Poor	17	29.8
	Middle	34	59.6
	Average	06	10.5
Age	Mean $\pm$ SD	$28.40 \pm 4.68$ years	
Gestational age	Mean $\pm$ SD	$33.0 \pm 3.73$ weeks	

**Table:2. Showed the distribution of patients according to risk factors n=58**

<b>Variables</b>		<b>Frequency</b>	<b>Percent</b>
<b>Hypertension</b>	Yes	20	35.1
	No	37	64.9
<b>Abruption</b>	Yes	06	10.5
	No	51	89.5
<b>Diabetes</b>	Yes	02	03.5
	No	55	96.5
<b>Pregnancy induced hypertension</b>	yes	07	12.3
	no	50	87.7
<b>PPH</b>	Yes	03	05.3
	No	54	94.7
<b>Anemia</b>	No anemia	10	17.5
	Mild anemia	10	17.5
	Moderate anemia	27	47.4
	Severe anemia	10	17.5
<b>Haemoglobin</b>	Mean±SD	07.91±2.71 g/dl	
<b>Serum creatinine level</b>	Mean±SD	3.03±2.02 mg/dl	



**Fig:1.** Correlation between haemoglobin level and serum creatinine (r-value 0.029), (p-0.058)

## DISCUSSION

Renal insufficiency in pregnancy is mostly due to pre-renal and ischemic causes, but can be due to specific pregnancy disorders. In this study, mean age was 28.40±4.68 years and mean gestational age was 28.40±4.68 years and 24.6% had parity 4-6. Most of the women 70.2% were un-booked. In comparison to our results, Arrayhani et al<sup>13</sup> reported an age range of 18-40 years and an average age of 29±6 years. The patients participating in the study had a median parity of 0-5. Similarly, Bokhari SR et al<sup>14</sup> reported mean age for remaining 41 subjects as 26±6 years, wherein Multigravida patients were 22 (54%), and primigravida were 19 (46%). The patients who did not obtain antenatal care of any form were 20 (48%), traditional birth attendants had visited 13 (31%) subjects, and gynecologist-provided sufficient antenatal care was received by just 8 (19%) subjects.

In the present study, majority of the patients had poor and middle socioeconomic status as 29.8% and 59.6% respectively. As well as Chaudhri N et al<sup>15</sup> reported that most patients were from low socioeconomic setting. According to the risk factors anaemic women were on high risk of renal impairment as most of the patients had moderate anemia. Hypertension was seen in 35.1% patients, abruption was in 10.5% cases, two patients had diabetes, 12.3% presented with pregnancy induced hypertension and postpartum haemorrhage was in 05.3% cases. Similar to our results, Aggarwal RS et al<sup>16</sup> reported that hemorrhage in 15 (30%) subjects was an etiological factor for ARF, in 10(20%) cases APH and in 5(10%) cases

PPH had been etiological factor for ARF. 11(22%) cases had undergone lower segment C-section (LSCS), whereas 36 (78%) cases had undergone normal vaginal delivery. In 20 patients (40%), puerperal sepsis appeared as an etiological factor, whereas pre-eclampsia, HELLP syndrome and eclampsia represented 18 (36%) cases. 2(4%) patients on presentation had disseminated intravascular coagulation, however hemolytic uremic syndrome was diagnosed in only 1 (2%) case. In another study of Goplani et al<sup>17</sup> also mentioned that the hemorrhage as the etiology for ARF was present in 38.56% of the patients, APH in 14.28% and PPH in 24.28% of patients. Preeclampsia, eclampsia and HELLP syndrome accounted for 28.57% of patients with pregnancy-related ARF. reported that the excessive obstetric bleeding has been a major factor for PRAKI. In Pakistan 28% and in India 5% cases of PRAKI have been observed.

Our results were relevant to the study of Ali et al.<sup>19</sup> that showed obstetric hemorrhage leading to AKI among 58% of cases. Study conducted by Sivakumar et al<sup>20</sup> reported that the PE as a cause of renal impairment to 75.2% of cases in Turkey. Hassan et al.<sup>21</sup> from Pakistan reported a substantially higher incidence of PRAKI (30%) in their series. The most frequent factor of renal cortical necrosis of kidney is obstetrical complications. Most patients in present study were found with >1 etiological factors, with the most frequent factor being sepsis. Preeclampsia was exacerbated by DIC bleeding and abruption of the placenta resulting in hemodynamic disruption (APH, ATN), IUD and occasionally RPOC induced sepsis. Only in a few cases, Preeclampsia by itself was accountable.

## **CONCLUSION**

Results of the current study revealed that the anemia was the commonest reason for renal impairment during pregnancy. Most of the women were un-booked, having high parity and were presented with anemia. By taking above scenario, this morbidity can be decreased and prevented by stabilizing the haemoglobin level by taking proper antenatal care. This was a single center and little sample study. However multicenter large sample size studies should be done on this subject.

## **REFERENCES**

- 1.** Vineet VM, Preeti AG, Rohina SA, Choudhary S, Tanvir T, Nisarg DD, Rashmi AG. A single-centre experience of obstetric acute kidney injury. *The Journal of Obstetrics and Gynecology of India*. 2016 Oct 1;66(1):207-11.
- 2.** Arrayhani M, El Youbi R, Sqalli T. Pregnancy-related acute kidney injury: experience of the nephrology unit at the university hospital of fez, morocco. *Int Sch Res Notices* 2013;2013.
- 3.** 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 Sep;8(9):1396.
- 4.** Papegowda SH, Devi PK, Singh RL, Muruganadam A, Tochwawng ZL. Acute kidney injury in obstetrics: a five-year study in a tertiary centre. *Int J Reprod Contracept Obstet Gynecol* 2020;9:113-9
- 5.** Siribamrungwong M, Chinudomwong P. Relation between acute kidney injury and pregnancy-related factors. *Journal of Acute Disease*. 2016 Jan 1;5(1):22-8.
- 6.** Mir MM, Nair MS, Chaudary AM, Azad H, Reshi AR, Banday KA et al. Postpartum acute kidney injury: experience of a tertiary care centre. *Indian J Nephrol*. 2017;27:181-4
- 7.** Hassan I, Junejo AM, Dawani ML. Etiology and outcome of acute renal failure in pregnancy. *J Coll Physicians Surg Pak*. 2009 Nov 1;19(11):714-.
- 8.** Prakash J, Ganiger VC. Acute kidney injury in pregnancy-specific disorders. *Indian J Nephrol* 2017;27:258-70.
- 9.** Mutiso SK, Sequeira E. Symptomatic hydronephrosis in pregnancy: a case series and literature review. Is bigger always better?. *Journal of Obstetrics and Gynaecology of Eastern and Central Africa*. 2015;27(1):15-9.
- 10.** Haroon F, Dhrolia MF, Qureshi R, Imtiaz S, Ahmed A. Frequency of pregnancy-related complications causing acute kidney injury in pregnant patients at a tertiary care hospital. *Saudi Journal of Kidney Diseases and Transplantation*. 2019;1;30(1):194.
- 11.** Khattak I, Yaqub U. Aetiology and Maternal Outcome in Pregnancies complicated by Acute Kidney Injury a Tertiary Care Single Centre Experience. *J Soc Obstet Gynaecol Pak*. 2020;29;10(1):19-24.
- 12.** Godara SM, Kute VB, Trivedi HL, Vanikar AV, Shah PR, Gumber MR, Patel HV, Gumber VM. Clinical profile and outcome of acute kidney injury related to pregnancy in developing countries: a single-center study from India. *Saudi Journal of Kidney Diseases and Transplantation*. 2014 Jul 1;25(4):906.

13. Arrayhani M, El Youbi R, Sqalli T. Pregnancy-related acute kidney injury: experience of the nephrology unit at the university hospital of fez, morocco. *International Scholarly Research Notices*. 2013;2013.
14. Bokhari SR, Inayat F, Jabeen M, Sardar Z, Saeed S, Malik AM, Nasir S, Zareen A, Ahmad HI. Characteristics and Outcome of Obstetric Acute Kidney Injury in Pakistan: A Single-center Prospective Observational Study. *Cureus*. 2018 Sep;10(9).
15. Chaudhri N, Masroor I, Qureshi MA, Shehzad MN, Abbasi MS, Karmani JK. Study Design: Case series. *Ann. Pak. Inst. Med. Sci.* 2011;7(2):57-61.
16. Aggarwal RS, Mishra VV, Jasani AF, Gumber M. Acute renal failure in pregnancy: Our experience. *Saudi J Kidney Dis Transpl* 2014;25:450-5
17. Goplani KR, Shah PR, Gera DN, et al. Pregnancy related acute renal failure: A single center experience. *Indian J Nephrol* 2008; 18: 17-21
18. Ansari MR, Laghari MS, Solangi KB. Acute renal failure in pregnancy: one year observational study at Liaquat University Hospital, Hyderabad. *JPMA. The Journal of the Pakistan Medical Association*. 2008 Feb;58(2):61.
19. Obstetrical acute renal failure from Frontier Province: a 3 years prospective study. Ali A, Zaffar S, Mehmood A, Nisar A. <https://www.jpmi.org.pk/index.php/jpmi/article/view/861/770> *J Postgrad Med Inst*. 2004;18:109–117
20. Sivakumar V, Sivaramakrishna G, Sainaresh V, Sriramnaveen P, Kishore C, Rani C, Jagadeesh K. Pregnancy-related acute renal failure: a ten-year experience. *Saudi Journal of Kidney Diseases and Transplantation*. 2011 Mar 1;22(2):352-.
21. Hassan I, Junejo AM, Dawani ML. Etiology and outcome of acute renal failure in pregnancy. *J Coll Physicians Surg Pak*. 2009 Nov 1;19(11):714-.