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Frequency of acute kidney injury in women with preeclampsia at Shaikh Zaid Women Hospital, SMBBMU Larkana

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ABSTRACT

Objective: To Determine The Frequency Of Acute Kidney Injury In Women With Preeclampsia Present At Shaikh Zaid Women Hospital Cmc, Smbbmu Larkana.

Study Design: Descriptive Cross-Sectional Study.

Setting ; This Study Was Conducted At The Department Of Obstetrics & Gynaecology, Smbbmu, Larkana, Pakistan.

Duration: Six Months After The Approval Of Synopsis From *June 29, 2022* To *December 28, 2022.*

Materials And Methods: All Patients Who Fulfilled The Inclusion Criteria And Visited To Smbbmu, Larkana Were Included In The Study. Informed Consent Was Taken After Explaining The Procedure, Risks And Benefits Of The Study. In Our Study, Written Consent Was Taken From All The Pregnant Preeclamptic Women And Recruited To Admit In Ward And Further Evaluated For Acute Kidney Injury. All The Collected Data Were Entered Into The Proforma.

Results: The Mean ± Sd Of Age Was 29.8±5.6 Years. The Mean ± Sd Of Parity Was 2.2±0.7 With C.I (2.08…….2.31). Acute Kidney Injury Was Found In 26 (18.6%) Women.

Conclusion.: It is to be concluded that acute kidney injury is prevalent in preeclamptic women. More studies are necessary with a larger sample size and with more parameters in multiple study centers in Pakistan are needed to validate the findings of the present study

Keywords: *Acute Kidney Injury, Preeclampsia, Prevalence, Risk Factors*

1. INTRODUCTION

Preeclampsia currently remains one of the leading causes of death and severe maternal morbidity is a disease that health professionals need to know how to deal with and take action [1]. The complexity of its etiology is a challenge and requires further studies for its full understanding [2]. Apparently, poor adaptation of the maternal organs to the conceptus, marked by the nonoccurrence of changes in the uterine spiral arteries, determines a series of systemic repercussions that compound the various forms of preeclampsia presentation [3]. The use of acetylsalicylic acid to prevent cases of early onset of the disease has been consolidated and, alongside the studies have advanced the development of accessible and effective.

methods of identifying women at risk of preeclampsia [4-6].

Gravida acute renal failure became a rare complication of pregnancy in industrialized countries, whereas it is still frequent in developing countries and responsible for fetomaternal morbidity and mortality [7]. The most common cause of acute renal failure in obstetric care units are severe sepsis and hemorrhagic shock [8]. Acute renal failure is the most challenging clinical problem when it occurs in pregnancy and required understanding of normal physiology of kidney in pregnancy

and natural history of different underlying renal disorders during pregnancy [9,10].

The global incidence of pregnancy-related acute kidney injury (AKI) has reduced over recent decades because of improvements in reproductive healthcare [11]. Pregnancy related AKI remains a common cause for requiring dialysis in low- and middle-income countries and is associated with high rates of maternal and neonatal morbidity and mortality [12]. There is limited understanding of underlying risk factors in these settings to enable appropriate triage and targeting of scarce resources [13]. Worldwide, hypertensive disorders of pregnancy are the most common cause of pregnancy- related AKI [14].

The awareness that recurrent preeclampsia in subsequent pregnancies may be associated with a higher risk of AKI may be useful in triaging patients, frequency of creatinine concentration testing, and determining the location of onward referral in developing countries [15]. Thus, the relationship between maximum blood pressure and risk of AKI warrants further investigation including whether controlling blood pressure in hypertensive pregnant women reduces the incidence or severity of AKI and other maternal and perinatal morbidities while the reported prevalence for acute kidney injury in preeclampsia is 0.08 and 15.3% [16,17].

Therefore, this study was helpful to generate local data as part of academics and also helpful to healthcare providers to assess the magnitude of acute kidney injury on priority basis in our population as early evaluation and timely management can prevent patients to have permanent kidney damage and proper specific healthcare strategies can be initialized according to the observations of present study. There was no former local study was conducted in our tertiary care teaching hospital giving all emergency and elective health facilities to the local city as well as periphery population of Sindh province. The findings of the study will be shared in various healthcare seminars to address the burden of disease in patient with preeclampsia as timely determination can save the patient to acquire life threatening events.

2. MATERIAL & METHODS

STUDY DESIGN

Descriptive Cross-Sectional Study.

STUDY SETTING

Department of Obstetrics & Gynaecology, SMBBMU, Larkana.

DURATION OF STUDY

Six months after the approval of synopsis from ***June 29, 2022*** to

December 28, 2022.

SAMPLE SIZE

Raosoft $n=z^2xp(1-p)/\varepsilon^2$ by taking the prevalence for acute kidney injury in preeclampsia 15.3%[17], d=6% (margin of error), n=140 women with preeclampsia were taken.

SAMPLING TECHNIQUE

Non-Probability, Consecutive Sampling.

SAMPLE SELECTION INCLUSION CRITERIA

All the pregnant women 20-45 years of age having gestational age

>20 weeks (assessed by taking clinical history for last menstrual period L.M.P), either primipara or multiparous presented in Department of Obstetrics and Gynaecology Shaikh Zaid Women

Hospital CMC, SMBBMU Larkana and diagnosed as preeclampsia (as per operational definition) were included in the study.

EXCLUSION CRITERIA

Pregnant women with disseminated intravascular coagulation (DIC) or bleeding disorder and use of anticoagulants.

The patients of known hematological malignancy (leukemia or lymphoma) and connective tissue disorder (RA or SLE) and known cases of chronic liver disease, chronic kidney disease and chronic hypertension.

The above disorders were evaluated on the basis of evidence of previous health record or diagnosed slips provided by relevant consultant obstetricians.

3. DATA COLLECTION

All women fulfilling the inclusion criteria were admitted and enrolled in the study after approval by CPSP for conducting the study. The written consent was taken from all the pregnant preeclamptic women (as per the operational definition) and were recruited to admit in ward and entered in the study and were further evaluated for acute kidney injury according to the criteria mentioned in the operational definition. The data was collected on pre-designed proforma and all such maneuvers [history taking, clinical examinations, sampling and data collection] were performed by the principal researcher under the

supervision of senior obstetrician of the ward having ≥03 years obstetrician experience whereas the financial burden of the study was paid by researcher herself while the study variables and effect modifiers as booked mother or un-booked mother, residence (urban or rural) anemia, diabetes mellitus, fever, height/weight and obesity, parity and urinary tract infection (UTI), smoking, educational status, family history of renal disease, previous history of preeclampsia and acute kidney injury were also explored.

4. DATA ANALYSIS

The data of all patients was analyzed in SPSS version 21.00. The frequency and percentage were calculated for booked mother or un- booked mother, residence (urban or rural) anemia, diabetes mellitus, fever, obesity, parity and urinary tract infection (UTI), smoking, educational status, family history of renal disease, previous history of preeclampsia and acute kidney injury. The mean and standard deviation (SD) or Med (IQR) as appropriate were calculated for height, weight, BMI, maternal and gestational age and parity. The stratification was done for booked mother or un-booked mother, residence (urban or rural) anemia, diabetes mellitus, fever, obesity, parity, urinary tract infection (UTI), smoking, educational status, family history of renal disease, previous history of preeclampsia, maternal age and gestational age to see the effect on the outcome and

to control the effect Fisher's Exact test modifiers. Post stratification Chi-square/Fischer exact test was applied on categorical variables at 95% confidence interval (CI) and the p-value ≤0.05 was considered statistically significant.

5. RESULTS

In this study 140 patients were included to assess the magnitude of acute kidney injury in women with preeclampsia present at Shaikh Zaid Women Hospital CMC, SMBBMU Larkana and the results were analyzed as:

The distribution of continuous variables was tested by applying Shapiro-Wilk test for age (P=0.076), weight (P=0.194), height (P=0.454), body mass index (P=0.215), gestational age (P=0.108) and parity (P=0.611) respectively, as shown in **TABLE 1**. In the distribution of residential status 91 (65.0%) were urban resident while 49 (35.0%) women were rural residents as shown in **FIGURE 1**.

In the distribution of antenatal status 56 (40.0%) were booked women while 84 (60.0%) females were unbooked as shown in **FIGURE 2**.

Out of 140 women, 69 (49.3%) were primipara while 71 (50.7%) women were multiparous as shown in **FIGURE 3**.

Anemia was noted in 36 (25.7%) women as shown in **FIGURE 4**. Diabetes mellitus was documented in 60 (42.9%) women as shown in **FIGURE 5**.

Fever was noted in 31 (22.1%) women as shown in **FIGURE 6**.

Out of 140 women, 29 (20.7%) were smokers while 111 (79.3%) women were non-smoker as shown in **FIGURE 7**.

Out of 140 women, 76 (54.3%) were obese while 64 (45.7%) were non-obese as shown in **FIGURE 8**.

Urinary tract infection was noted in 83 (59.3%) women as shown in

FIGURE 9.

Positive family history of renal disease was found to be in 41 (29.3%) women as shown in **FIGURE 10**.

Positive family history of preeclampsia was found to be in 34 (24.3%) women as shown in **FIGURE 11**.

Acute kidney injury was found to be in 26 (18.6%) women as shown in FIGURE 12.

TABLE # 1: DESCRIPTIVE STATISTICS OF SHAPIRO-WILK TEST n=140

VARIABLE	MEAN±SD	P-VALUE

Age (years)	29.8±	0.076
Weight (kg)	66.8±11.9	0.194
Height (cm)	161.5±17.3	0.454
BMI (kg/m^2)	27.1±5.5	0.215
Gestational Age (weeks)	34.3±5.1	0.108
Parity	2.2±0.7	0.611

FIGURE # 1: FREQUENCY OF RESIDENTIAL STATUS n=140

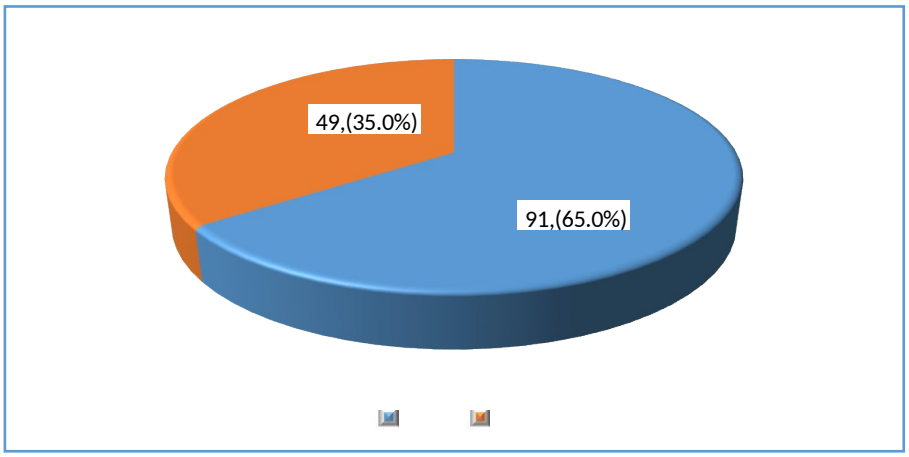


FIGURE # 2 FREQUENCY OF ANTENATAL CARE

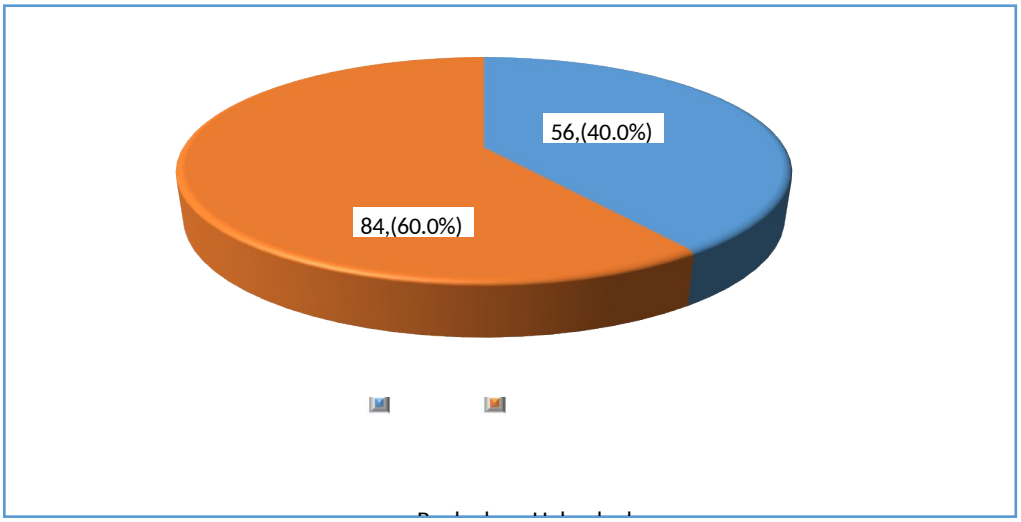


FIGURE # 3 FREQUENCY OF PARITY n=140

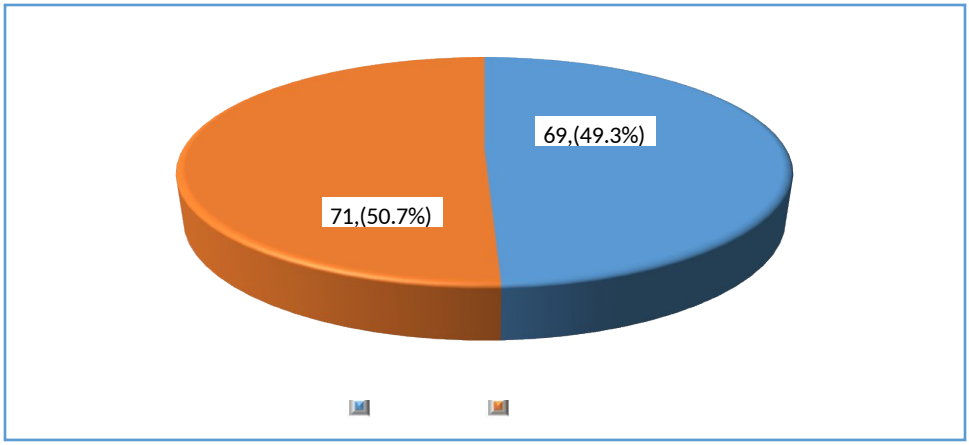


FIGURE # 4 FREQUENCY OF ANEMIA

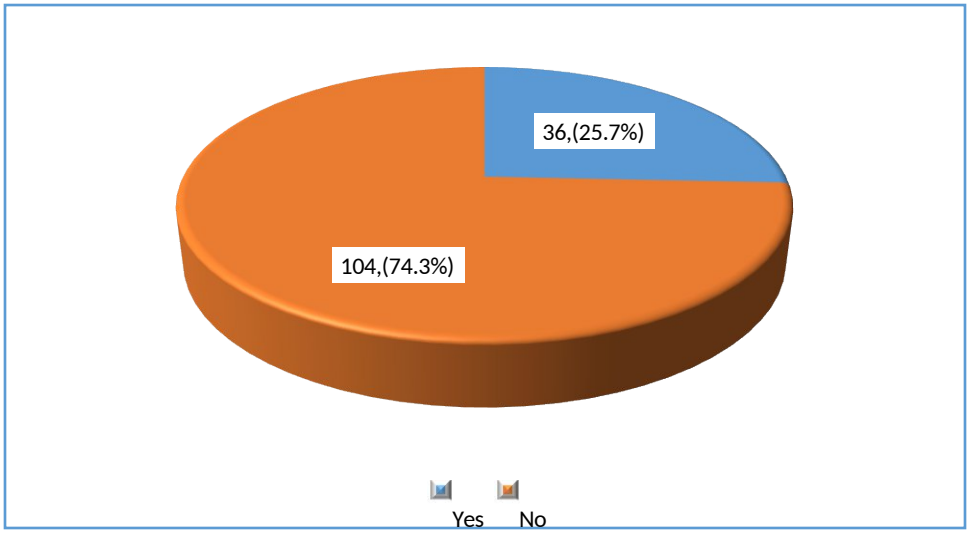


FIGURE # 5 FREQUENCY OF DIABETES MELLITUS

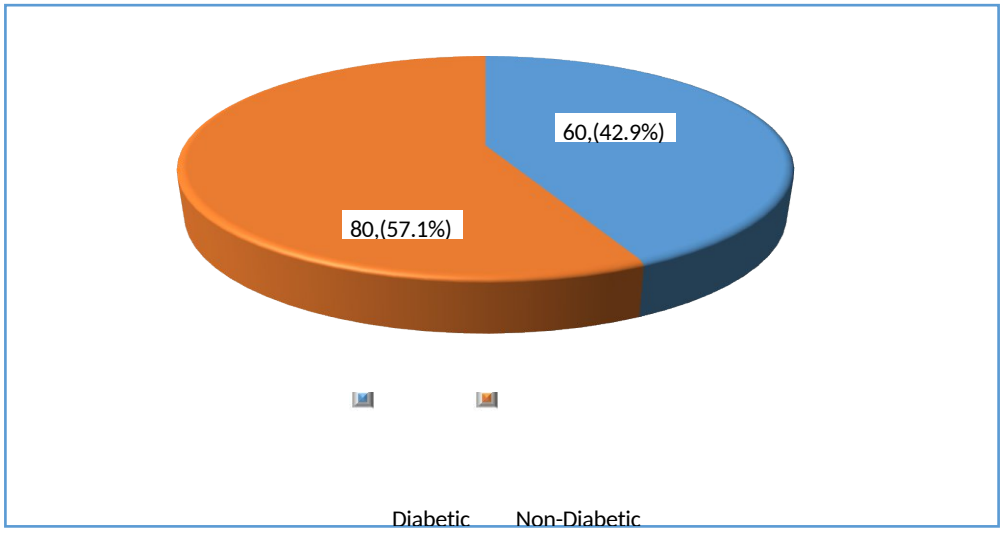


Figure 6: Frequency of fever

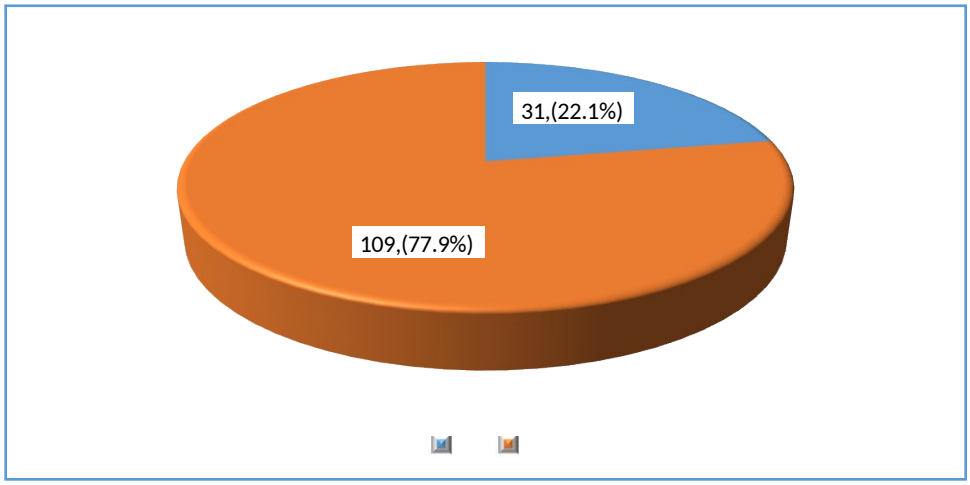


FIGURE # 7 FREQUENCY OF SMOKING STATUS

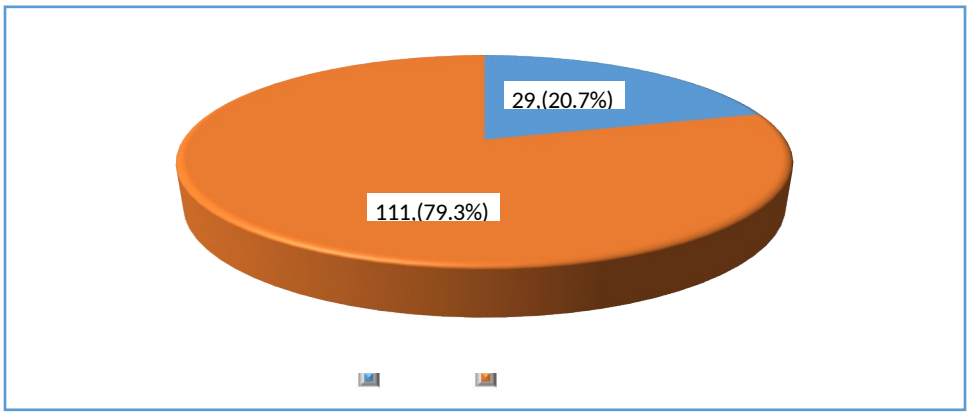


FIGURE # 8 FREQUENCY OF OBESITY

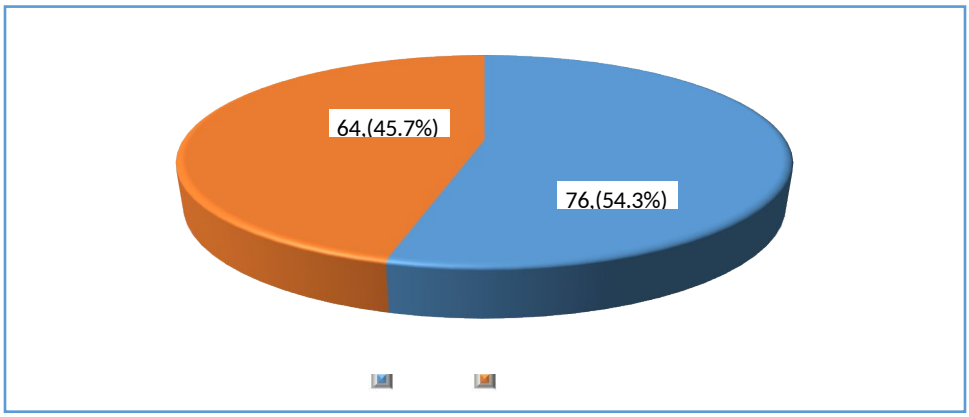


FIGURE # 9 FREQUENCY OF URINARY TRACT INFECTION n=140

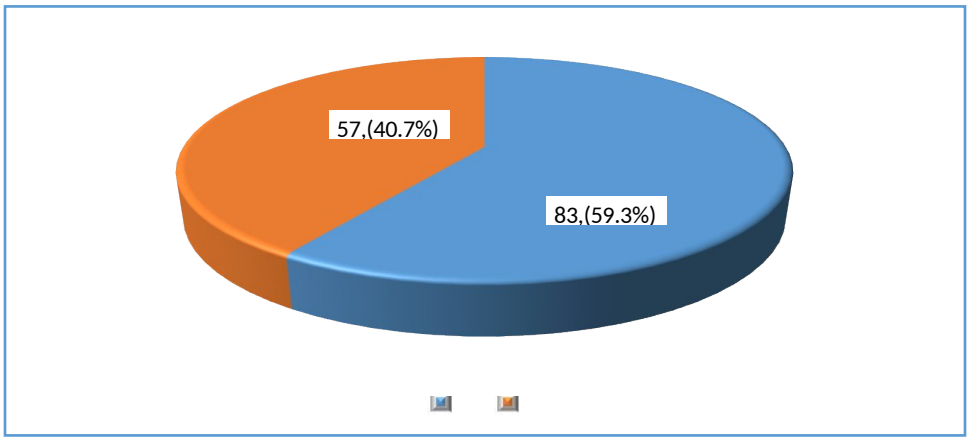


FIGURE # 10 FREQUENCY FOR FAMILY HISTORY OF RENAL DISEASE n=140

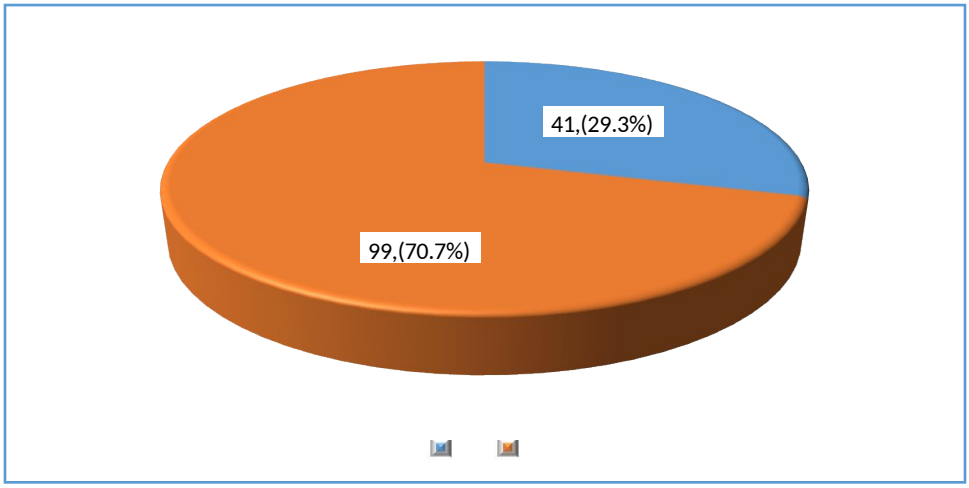


FIGURE # 11: FREQUENCY FOR PREVIOUS HISTORY OF PREECLAMPSIA n=140

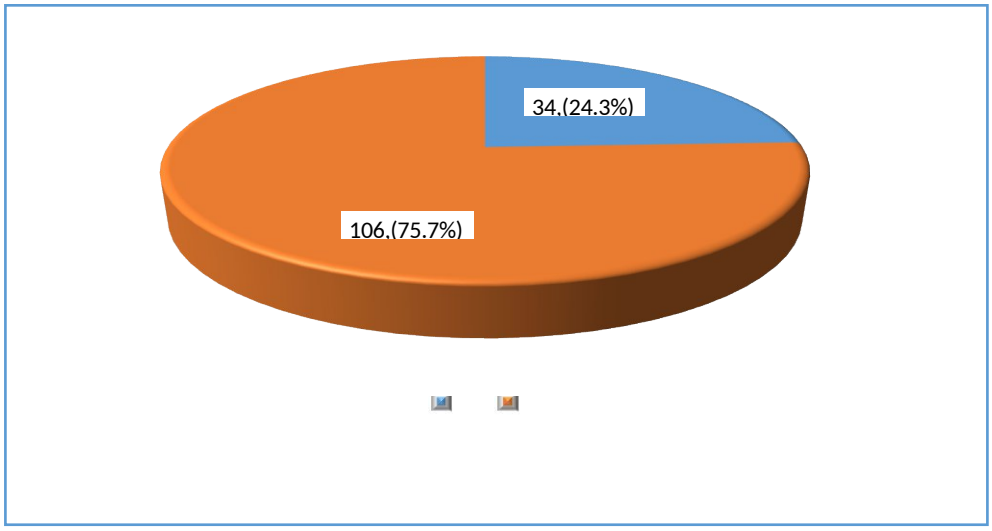
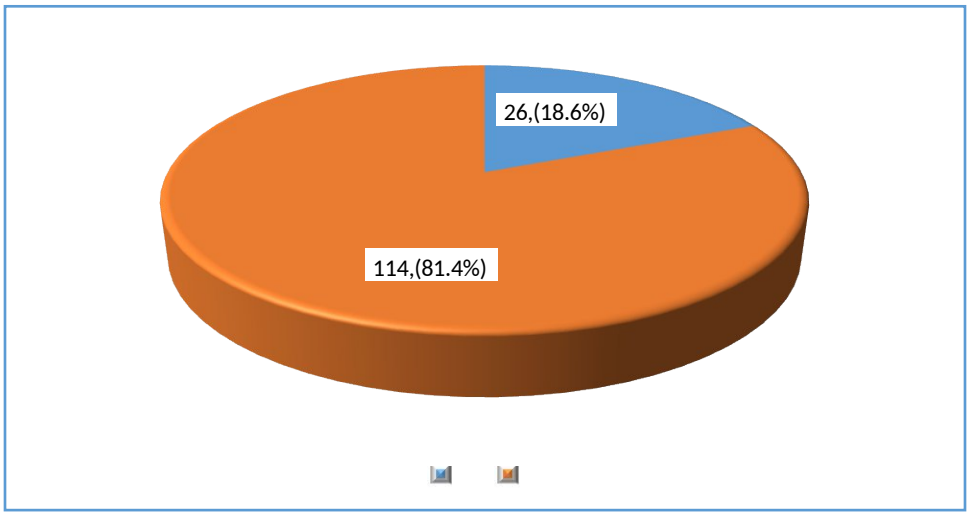


FIGURE # 12: FREQUENCY OF ACUTE KIDNEY INJURY n=140



6. DISCUSSION

Although the incidence of pregnancy-related acute kidney injury (PR- AKI) is reported to have decreased, especially in the developed nations, it is associated with significant maternal and fetal morbidity and mortality [18]. Acute kidney injury (AKI) is reported in approximately 1% of women with severe preeclampsia and 3% to 15% of women with hemolysis, elevated liver enzymes, and low platelets (HELLP) syndrome [19,20]. Although decreasing in developing countries, PR-AKI continues to be a significant problem and is due to septic abortion and puerperal sepsis. This difference in incidence between nations arises from legalization of abortion in the developed countries and variation in patient demographics, standard of care, and access to prenatal care. There are many definitions of PR-AKI in the literature. This lack of consensus is a major limitation to our understanding of PR-AKI. Questions as to the best method to measure estimated glomerular filtration rate (GFR) and proteinuria in pregnancy still remain. With these caveats, we summarize adaptive changes in the kidney during pregnancy, etiologies of PR-AKI, current diagnostic criteria, and treatment options.

The global burden of acute kidney injury is increasing [21]. AKI severity, duration, and clinical context influence outcomes including

the development of hypertension, chronic kidney disease (CKD), and dialysis dependence [22,23]. Although AKI is most often studied in elderly and critically ill populations, it is also observed in children and young adults [24,25]. Young women have been an underrepresented group of study in AKI research, yet the consequences of AKI in young women may be more immediate because of the increased demands on renal function in pregnancy.

Preeclampsia is a multisystem disorder of pregnancy characterized by widespread endothelial dysfunction resulting in elevated blood pressure and end-organ damage in the second half of pregnancy [26]. Increased placental production of sFlt-1 (soluble fms-like tyrosine kinase 1), an antagonist of VEGF (vascular endothelial growth factor), plays a central role in the pathogenesis of preeclampsia [27,28]. Many risk factors for preeclampsia are recognized, including nulliparity, obesity, sociodemographic characteristics, and preexisting hypertension [29].

The global incidence of pregnancy-related acute kidney injury (AKI) has reduced over recent decades because of improvements in reproductive health care [30-33]. Pregnancy related AKI remains a common cause for requiring dialysis in low- and middle-income countries [34,35] and is associated with high rates of maternal and neonatal morbidity and mortality [36,37]. There is limited

understanding of underlying risk factors in these settings to enable appropriate triage and targeting of scare resources. In addition, currently published studies are predominantly retrospective, are limited by diverse definitions of AKI, and few report incidence according to Kidney Disease Improving Global Outcomes (KDIGO) criteria [38].

Since 1960, the incidence of acute kidney injury in pregnancy has been reduced significantly and currently affects 1 per 20,000 pregnancies [39]. The legalization of abortion contributed to this decline in most developed countries, leading to a reduction in the number of septic abortions – the main cause of AKI in recent decades. Moreover, the accessibility of improved prenatal care and diagnostic tools has been extended, and new therapeutics have been developed. Despite a favorable trend in incidence rates, maternal and perinatal morbidity and mortality remain significant problems.

The findings of our study are comparable with multiple studies conducted worldwide. Some of them are discussed here.

In our study, the mean age was 29.8±5.6 years. Shah S, et al noted median age to be 27 years [16].

In my study, acute kidney injury was found in 26 (18.6%) women. Other studies reported the prevalence of acute kidney injury in preeclampsia as 0.08 and 15.3%, respectively [16,17].

7. CONCLUSION

It is to be concluded that acute kidney injury is prevalent in preeclamptic women. More studies are necessary with a larger sample size and with more parameters in multiple study centers in Pakistan are needed to validate the findings of the present study..

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