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Research Article

### A RESEARCH STUDY ON THE ASSESSMENT OF THE REASONS OF ACUTE KIDNEY FAILURE IN NEONATES

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**Abstract:**

**Objective:** Acute kidney failure (AKF) is very frequent disorder among the admitted newborns in the ICU. In majority of patients, acute kidney failure goes together with a prompting factor like sepsis, failure of heart, perinatal asphyxia and/or prematurity. This research work aimed to find out the reasons and consequences of AKF in the neonates getting treatment in the hospital.

**Methodology:** This is an elaborate transverse research work. In this study, we assessed the newborns suffering admitted in DHQ Hospital, Faisalabad from April 2017 to October 2018.

**Results:** There were total eighty five patients suffering from acute kidney failure among three thousand hospitalized newborns (2.830%). Male patients outnumbered the female patients. Majority of the involved cases were term (70.60%). The occurrence of renal, pre-renal & post-renal reasons of AKF was 49.40%, 43.50% & 7.10% correspondingly. The very frequent prompting features for AKF in this research work were surgery in 43.50% patients, perinatal asphyxia in 36.50% patients, sepsis in 32.90% patients, and syndrome of distress respiratory system in 25.90% patients, failure of heart in 20.0% patients & problem related to feeding in 20.0% patients. All the patients were available with more than one prompting factor. Among the newborn patients with AKF, the rate of mortality was 20.0% & this mortality rate was much high as compared to the patients on ventilation & sepsis.

**Conclusion:** In time identification of the factors of risks like sepsis, asphyxia or problems during surgery and fast effectual therapy of these causative conditions will decrease the AKF in the period of neonate life of newborns.

**Keywords:** Sepsis, Prompting, Mortality, Renal, Neonate, Newborn, Frequent, Correspondingly, Syndrome, Asphyxia, Transverse.

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**INTRODUCTION:**

The deterioration in the function of kidneys to establish the homeostasis of the fluids of body is AKF. It is also association with the GFR rate (Glomerular Filtration Rate) this is the cause of retaining wasted & toxic metabolic final products [1,2]. The AKF in neonates in initial life days is due to the rapid increase in the PCR of the infants (Plasma Creatinine) more than routine values for this age in the context of healthy function of kidney in mothers [2]. Most of the case works state the prevalence of AKF in the population of neonate in the hospital to be 8.0% to 24.0%[1-7].The normal output of urine was 1/3 of newborns with AKF but less output of urine may occur in the non-availability of the AKF. If there is the utilization of check of output of only urine for evaluation of the kidney function, it is very difficult to diagnose the AKF. The prevalence of the oliguric AKF in neonates having admission in ICU ranged from 1% to 6% in retroactive case works &6.0% to 8.0% in prospective case works [2].

The level of serum creatinine is the simple and most utilized identifier for the function of kidneys of neonates. The concentration of the plasma creatinine just after the birth shows the concentration of the creatinine of the mothers. The level of plasma creatinine reduces in the first two weeks of life. Generally, doubling of the level of serum creatinine embodies a fifty percent decrease in the GFR rate [1,2]. It is necessary to measure GFR to detect AKF in newborn babies [1,2,6,7, 8].

A high quantity of prompting factors like sepsis, diseases of heart, disorders of metabolism and perinatal asphyxia can be the cause of the kidney

failure in the neonates. This study carried out to find out the reasons and consequences of AKF in the newborns getting treatment in the hospital.

**METHODOLOGY:**

The research work was carried out on the newborns getting treatment in the DHQ Hospital, Faisalabad. There were total 3000 births of newborns in the hospital from April 2017 to October 2018. We evaluated the neonates with kidney failure among them. Acute kidney failure defined as PCR concentration of greater than 1.50 mg/dl & BUD (Blood Urea Nitrogen) greater than 20.0 mg/dl on 2 different testswith a duration of twelve hours apart. We defined the oliguria as the output of urine smaller than one ml/kg/h. in the total duration of eighteen months of this research work, we diagnosed the acute kidney failure in eighty five patients.

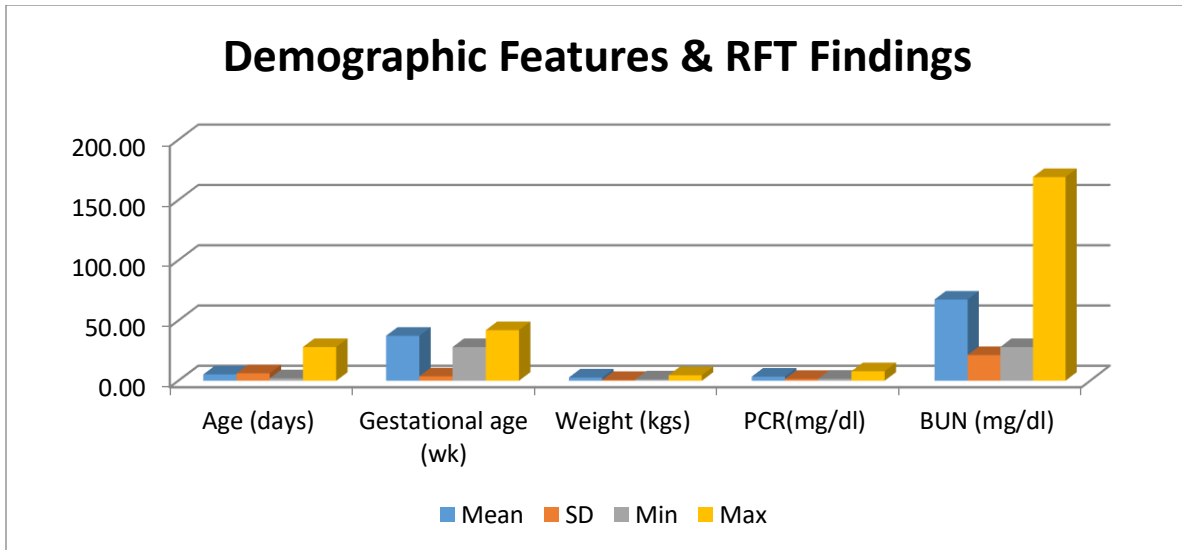
We collected the information with the help of elaborate questionnaires about the information of demography of newborns, prompting conditions, medical course & consequence of acute kidney failure. SPSS V.12 was in utilization for the statistical analysis of the collected information. Less than .050 was the significant P value.

**RESULTS:**

We identifies acute kidney failure in eighty five patients (2.83%) among admitted new births. There were sixty seven percent (n: 57) male patients and thirty three percent (n: 28) were female patients. Male patients outnumbered the female patients. Majority of patients suffering from AKF were term (sixty patients). Total 25.90% (n: 22) patients found with prematurity and 3.50% (n: 3) patients were post-term.

Demographic traits and tests of the function of kidney are available in Table-1.

<b>Table-I: Demographic Characteristics and Renal Function Tests of Hospitalized Neonates</b>				
Features	Mean	SD	Min	Max
Age (days)	5.26	6.20	2.0	28.0
Gestational age (wk)	37.35	3.66	28.0	42.0
Weight (kgs)	2.70	0.60	1.1	4.6
PCR(mg/dl)	3.40	1.50	1.6	7.9
BUN (mg/dl)	67.42	21.29	28.0	169.0



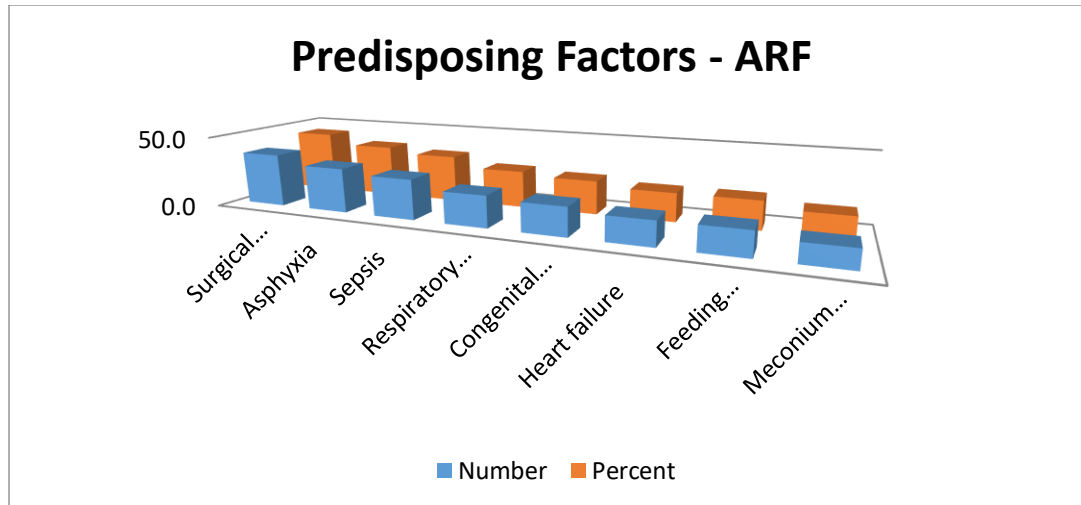
Oliguria acute kidney failure was available in 32.80% (n: 28) patients, the occurrence of renal, pre-renal & post-renal kinds of AKF 49.40%, 43.50% & 7.10% correspondingly. Prompting factors of AKF are available in Table-2. All the patients found with more than one prompting factor.

Congenital abnormalities of kidney were available in 6 patients in which 3 patients were suffering from kidney hypoplasia, 2 patients from polycystic kidney & one patient had multicystic dysplastic kidney. Six

patients were available with the obstructive path of urine, 3 patients found with obstruction of ureteropelvic junction and 3 newborns found with posterior urethral valve. Majority of newborns getting treatment in the hospital with acute kidney failure was 20.0% (n: 17) patients. Female patients outnumbered male patients in this matter. The rate of mortality was much high in females as compared to the male patients. Patients having sepsis, clinical sepsis and on assisted ventilation found with high rate of mortality.

**Table-II: Predisposing Factors for ARF**

Factors	Number	Percent
Surgical procedure	37.0	43.50
Asphyxia	31.0	36.50
Sepsis	28.0	32.90
Respiratory distress syndrome	22.0	25.90
Congenital anomalies+	20.0	23.50
Heart failure	17.0	20.00
Feeding problems	17.0	20.00
Meconium aspiration	13.0	15.30



### DISCUSSION:

Many of the anomalies may be reason of AKF in newborns. The very frequent kind of AKF in newborns is pre-renal which is in the category of insufficient renal perfusion. Early and aggressive administration of pre-renal azotemia normally is the cause of improvement in the function of kidneys and better output of urine [2]. In this research work, there were 43.50% pre-renal azotemia which is smaller than renal kind. This can be result of late hospitalization & late management which can lead to the more injury to kidney. The most frequent kidney failure is ATN (Acute Tubular Necrosis). Acute tubular necrosis can be the output of single incidence, its development in multifactorial & it involves hemodynamic, cellular factors of nephron related factors.

Less flow of blood from kidneys may result from various mechanisms like hypotension, failure of heart & vasoconstriction [7]. In current case work, 2.830% newborns found with AKF who were getting treatment in the hospital. As in other case works, the most common prompting factor for AKF in our participants were procedures of surgery, asphyxia & sepsis [4,6,7,9,10]. The danger and seriousness of AKF rises with the combination of asphyxia. AKF linked with asphyxia is mainly non-oliguric. In this research work, thirty one newborns were available with moderate to severe asphyxiated & their acute kidney failure was non-oliguric in twenty eight patients. The occurrence of AKF is dominant in males in comparison with females which is same as described by other case works [11, 12, 13]. The prompting factors as sepsis & syndrome of distress in respiratory system are very frequent in boys in comparison with females. There were total 32.90%

(n: 28) oliguric failure of kidney in this research work which is much below than the other case works [14].

In some case studies, the rate of mortality in oliguric AKF because of acquired conditions like asphyxia & sepsis was 60.0%. There are some case works available with high rate of mortality with the availability of diseases of heart. In this case work, rate of mortality among the newborns getting treatment in the ICU was 20.0% (n: 17). The most vital factors of risks for this rate of mortality was sepsis & assisted ventilation. The rate of mortality in girls was much high in comparison with the boys.

The most important step to prevent as well as treat the AKF is to know about the risks of the kidney failure and diagnosis of oliguria just after the prompting incidences. There should be a regular follow up of urine, vital symptoms and function of kidney in those patients. In time identification of the risk factors and fast effectual treatment has the ability decrease the morbidity as well as mortality among newborns suffering from acute kidney failure.

### CONCLUSIONS:

There is very high risk of prompting factors of AKF among neonates. There is a need of prevention of those prompting factors, any complication in oxygenation, cardiac output, BP, ventilation & fast treatment of sepsis for the credible administration of the acute kidney failures.

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