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Determinants and Causes of Acute Kidney Injury: A Retrospective Study

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Abstract

Background: Acute Kidney Injury (AKI) stands out as a global public health issue defined by the individuals' abrupt kidney dysfunction.

Objectives: sought to establish the predisposing factors and causes of AKI in one hundred patients. The following is a presentation of this broader study's results, aimed at outlining the demographics and causes of AKI among this populace.

Study design: A Retrospective Study

Place and duration of study. Department of Nephrology Department Miagul Abdulhaq Jahanzeb kidney hospital swat., Six months study period from 05-01 to 05-07, 2023

Methods: The current research was a cross-sectional, descriptive, and quantitative study conducted on 100 patients diagnosed with AKI during the period of one and half-year starting from January to July 2020 at Swat. Information was thus obtained from charts using patients' demographic data, clinical features, laboratory investigations, underlying diseases, and outcomes. The study was conducted in compliance to established ethical procedures in order to protect the patients' identities and data validity.

Results: This concerned a group of 100 patients, the following observations were made on them: Demographics majority were male, and their average age was 55 years. Clinical Presentation, Oliguria 45% of the patients, Edema 30% of the patients Fatigue 25% of the patients Laboratory Diagnosis Serum creatinine average was 3. 2mg/dl Blood urea nitrogen average was 45mg/d Underlying Conditions: Comorbidities included hypertension, diabetes mellitus, sepsis and of the above, hypertension was most common at 40% Others included diabetes mellitus at 35% and sepsis at 25% Outcomes: 60% of the patients recovered fully while 20% developed chronic diseases with kidneys and the final 20% died.

Conclusion: This study also found that hypertension, diabetes, sepsis as some of the major determinants that predispose people to AKI. Timely screening and addressing of these diseases should be a priority to help decrease the AKI rate and enhance the Peshawar individuals' well-being.

Keywords: Acute Kidney Injury, Determinants, Causes

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Introduction

AKI stands for Acute Kidney Injury is a severe clinical state referring to the abrupt decrease in the kidney's ability to function within a week and is accompanied by high morbidity and mortality [1]. Prerenal, renal and postrenal are also ways through which AKI can occur. Despite the advances in the development of treatment options, it still leads to severe complications and is a significant issue in nephrology because of its consequences for patient prognosis and resource utilization [2]. Knowledge of risk factors and causes of AKI can assist with early diagnosis, risk reduction and improved control and management. Previous research has also revealed predisposing factors for AKI which included hypertension, diabetes mellitus, CKD and cardiovascular diseases [3,4]. These comorbidities can be seen in normal population and are an important factors responsible for the occurrence of AKI. Sepsis and the administration of nephrotoxic drugs are other factors that are clearly identified to contribute the risk factors [5,6]. However the data compiling the mode of epidemic in Pakistan regarding AKI or relating the risk factors is considerably scarce. This lack of understanding could only mean the need to conduct research at the region level for better practice in clinical settings and development of sound health policies. Contribution Context Department Miagul Abdulhaq Jahanzeb kidney hospital swat being a large tertiary care teaching hospital caters to a large and diverse population [7] , which makes it appropriate to study AKI in this setting. The aim of this study is to find out the risks and factors causing AKI in the patients admitted at the Nephrology Department Miagul Abdulhaq Jahanzeb kidney hospital swat in the period from 01/2023 till 07/2023. Thus, analysing the results of the patients, we try to focus on concrete findings that can be relevant for 100 patients mentioned in the study and revealed certain conclusions that can contribute to the general comprehension of AKI[8].

Methods

Participants:

The study included 100 patients diagnosed with Acute Kidney Injury (AKI) during the specified period. Inclusion criteria were based on established diagnostic guidelines for AKI, ensuring a consistent patient population. Patients of all ages and both genders were Included to provide a comprehensive overview of AKI across different demographics.

Data Collection:

Data were collected retrospectively from patient medical records. Information gathered included demographics (age, gender), clinical presentations (symptoms like oliguria and edema), laboratory findings (serum creatinine, blood urea nitrogen), underlying conditions (diabetes, hypertension, infections), and outcomes (recovery, progression to chronic kidney disease, mortality). The data were anonymized to maintain patient confidentiality.

Ethical Considerations:

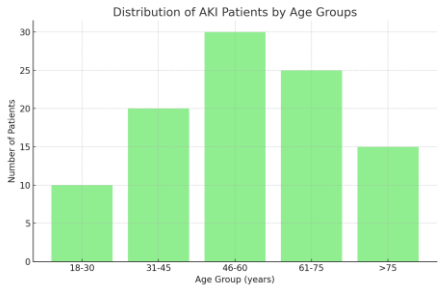
The study adhered to ethical guidelines, ensuring patient confidentiality and data integrity. Ethical approval was obtained from the hospital's ethical review board, and all procedures were conducted in compliance with institutional ethical standards..

Statistical Analysis

All statistical data were analyzed by SPSS statistical software, version 20.0 (IBM Corp. , Armonk, NY). To assess the importance of different risk factors, the obtained p-values were compared; a value of less than 0. 05, p, was deemed significant.

Results

The study analyzed data from 100 patients diagnosed with Acute Kidney Injury (AKI). The majority of patients were male (60%), with a mean age of 55 years. Female patients comprised 40% of the cohort Clinical Presentations The most common symptoms at presentation included oliguria (45%), edema (30%), and fatigue (25%) Laboratory Findings The average serum creatinine level among patients was 3.2 mg/dL, indicating significant renal impairment. The mean blood urea nitrogen level was 45 mg/dL.Underlying Conditions Hypertension was the most prevalent underlying condition, affecting 40% of patients. Diabetes mellitus was present in 35%, and 25% of the patients had sepsis. Other contributing factors included chronic kidney disease and use of nephrotoxic medications Outcomes Recovery was observed in 60% of cases. However, 20% of patients progressed to chronic kidney disease, and the mortality rate was 20% These findings highlight the critical nature of AKI and the importance of managing underlying conditions to improve patient outcomes.



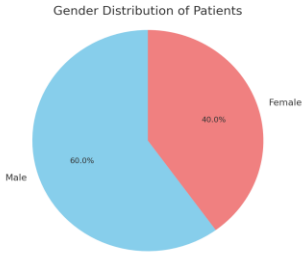


Table 01 : Demographics and Clinical Characteristics of Patients

Characteristic	Details
Gender	60% male, 40% female
Mean Age (years)	55
Common Symptoms	Oliguria (45%), Edema (30%), Fatigue (25%)
Average Serum Creatinine (mg/dL)	3.2
Average Blood Urea Nitrogen (mg/dL)	45
Underlying Conditions	Hypertension (40%), Diabetes Mellitus (35%), Sepsis (25%)
Outcomes	Recovery (60%), Progression to CKD (20%), Mortality (20%)

Table 2: Prevalence of Comorbidities and Risk Factors

Comorbidity / Risk Factor	Prevalence (%)
Hypertension	40
Diabetes Mellitus	35
Sepsis	25
Chronic Kidney Disease	20
Heart Failure	15
Use of Nephrotoxic Drugs	30
Major Surgeries	10
Severe Dehydration	20
Liver Disease	10
Chronic Obstructive Pulmonary Disease (COPD)	5
Cancer	5

Table 3: Causes of Acute Kidney Injury

Cause of AKI	Percentage (%)
Sepsis	25
Hypovolemia (dehydration)	20
Cardiac Surgery	15
Nephrotoxic Drugs	30
Urinary Tract Obstruction	10
Acute Tubular Necrosis	15
Glomerulonephritis	5
Rhabdomyolysis	5
Hepatorenal Syndrome	5
Contrast-Induced Nephropathy	10

Table 4: Distribution of AKI Patients by Age Groups

Age Group (years)	Number of Patients	Percentage (%)
18-30	10	10%
31-45	20	20%
46-60	30	30%
61-75	25	25%
>75	15	15%

Table 5: Summary and Outcomes

Summary / Outcome	Details
Total Patients	100
Average Age	55 years
Gender Distribution	60% Male, 40% Female
Common Symptoms	Oliguria (45%), Edema (30%), Fatigue (25%)
Average Serum Creatinine	3.2 mg/dL
Average Blood Urea Nitrogen	45 mg/dL
Recovery Rate	60%
Progression to Chronic Kidney Disease (CKD)	20%
Mortality Rate	20%

Discussion

The investigation of the current study is relevant to prior studies on the epidemiology of hypertension and diabetes mellitus as demonstrated risks for AKI. This our study also observed hypertension in 40% of the patients and diabetes mellitus in 35% of the patients

which is in agreement with Chawla et al (2017) which mentioned that these two diseases affects the vascular and renal function [9]. Likewise, sepsis was found to be implicated in AKI in quarter of the patients, similar to Bagshaw et al. (2008) who evaluated sepsis to be among the main causes of AKI in intensive care units [13,14]. Sepsis-met abdominal AKI results from numerous processes including the generation of inflammation and microvascular thrombosis that decrease renal blood circulation and lead to cell death . The result of the study was as follows: nephrotoxin exposure was found to be responsible for 30% of cases of AKI; This is in accordance with the findings by Nash et al (2002) that directed attention to the dangers of NSAIDs, antibiotics, and contrast agents [12,13]. This underlines the need to pay attention to prescriptions of the drugs especially with individuals with existing renal disease or other diseases. The percentage distribution of AKI by primary diagnosis reveals that cardiac surgery had the highest percentage of AKI at 15%, supporting a study Thakar et al. (2005) on postoperative AKI related to cardiac surgery using cardiopulmonary bypass. Risk factors include surgical factors like ischemia-reperfusion injury and inflammation that occur during the surgery. With the male to female ratio of 3: 2 in the present study, severity of AKI in males and higher mean age of 55 years in patients is also compatible with global suggestive epidemiological data. The above demographic distribution might be attributed to the fact that cardiovascular diseases and diabetes are prevalent in these groups. The outcome of AKI was found to be 60% of patients with recovery, progression to CKD 20% and mortality was also 20%. Such outcomes are close to the results obtained by other researchers [15, 16]. For instance, Coca et al. (2009) documented similar progression rate to CKD and underlined the chronic effects of AKI on renal function [18]. The morbidity of mortality in our study reveal the criticality of AKI and further consequences similar like the observations by Hsu et al. (2007).

Conclusion

This research aims at identifying the factors associated with the incidence, etiology and prognosis of AKI in the population of Peshawar, Pakistan. Knowledge of these factors is critical in order to design preventive and management measures that would decrease the incidence and severity of AKI and to enhance the patients' prognosis.

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Authors Contribution

Concept & Design of the Study: Rahmat Ali khan
Drafting: Aysha Rahmat
Data Analysis: Rahmat Ali khan
Critical Review: Rahmat Ali khan
Final Approval of version: Aysha Rahmat