*Case Series*

# A prospective observational study on electrolytes imbalances in emergency patients at Kauvery Hospital, Cantonment

**B. Madhumitha***

Group Clinical Pharmacist, Kauvery Hospital, Trichy
*Correspondence

## 1. Introduction

Electrolyte imbalance (EI) is an independent predictor of mortality, and the prevalence and incidence of EI in the emergency department (ED) are of great clinical importance because these disorders have been associated with an increased risk of mortality [1], [2], [3]. Thus, prompt diagnosis and treatment are crucial in the management of patients admitted to the ED.

Electrolyte imbalances are common findings in many diseases [1,2] Imbalances in every electrolyte must be considered in a combined and associated fashion, and examinations must aim to clarify the clinical scenario for effective and successful treatment. Most important and prevailing electrolyte imbalances are hypo- and hyper-states of sodium, potassium, calcium, and magnesium.

The kidney is a principally responsible organ for retention and excretion of electrolytes and fluids in healthy individuals.[3]

In the Emergency department, patients often present with nonspecific symptoms such as fatigue, dizziness, confusion, vomiting, seizure- which can be attributed to underlying electrolyte disorder. common causes include CKD, dehydration, infections, endocrine abnormalities, gastrointestinal losses, systemic conditions like sepsis or heart failure.

Despite the clinical significance of these abnormalities, electrolyte testing is sometimes overlooked in busy emergency settings where rapid stabilization is prioritized. Failure to identify and correct electrolyte imbalances in a timely manner can lead to serious complications such as arrhythmias, seizures, hypotension, or altered mental status, coma and death. Conversely, early detection can guide appropriate diagnosis, reduce unnecessary interventions and improve overall patient outcomes.

In this study we evaluated the general characteristics of patients admitted to our emergency department (ED) and diagnosed them as having electrolyte imbalance. Literature data generally focused on imbalances of specific electrolytes, and most of the studies recruited patients of a specific disease or risk group.

**Citation:** B. Madhumitha. A prospective observational study on electrolytes imbalances in emergency patients at Kauvery Hospital, Cantonment. Kauverian Med J., 2025;2(7):1-7

Academic Editor: Dr. Venkita S. Suresh

ISSN: 2584-1572 (Online)

## 2. Materials and Methods

### 2.1 Study Design

This study was a prospective observational study conducted in the Emergency Department (ED) of kauvery Hospital, Cantonment from January to April 2025. The study aimed to evaluate the prevalence of electrolyte imbalances and their association with clinical diagnoses in emergency patients.

### 2.2 Study Population

The study included adult patients who presented the ED during the study period. Inclusion criteria were patients aged 18 yrs. and older who had blood test ordered as a part of their routine clinical workup.

### 2.3 Data Collection

Demographic data (age, sex, medical history) were collected from the hospital's patient records. Serum electrolyte levels (sodium, potassium, chloride, bicarbonate, creatinine and urea) were measured using standard laboratory methods. Data on clinical presentation, primary diagnosis and any underlying medical condition were also recorded.

### 2.4 Electrolyte Imbalance Definitions

Electrolyte imbalances were defined according to established clinical thresholds. Hyponatremia was defined as a serum sodium label<135mEq/L, Hyperkalemia as a potassium level >5.5mEq/L, Hypokalemia as a potassium level <3.5mEq/L. Other electrolytes disturbances were classified by the reference range of laboratory.

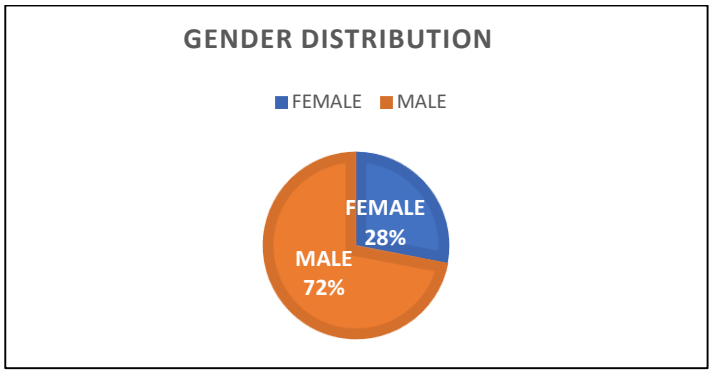
### 2.5 Statistical Analysis

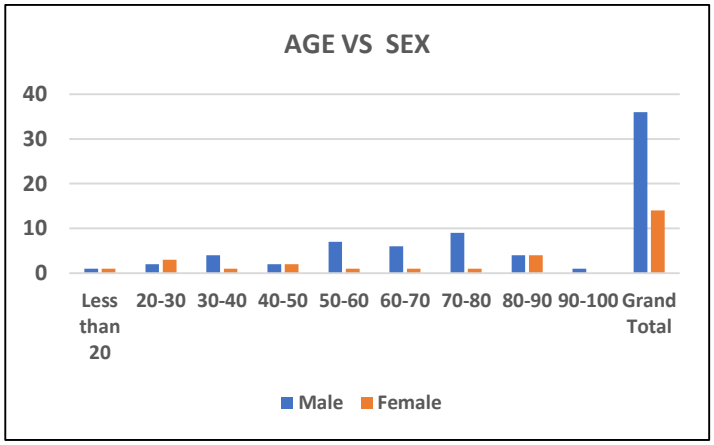
Descriptive statistics were used to summarize the demographic characteristics of the study population and the distribution of electrolyte imbalances. The relationship between electrolyte imbalances and the clinical diagnoses was analyzed

### 2.6 Results

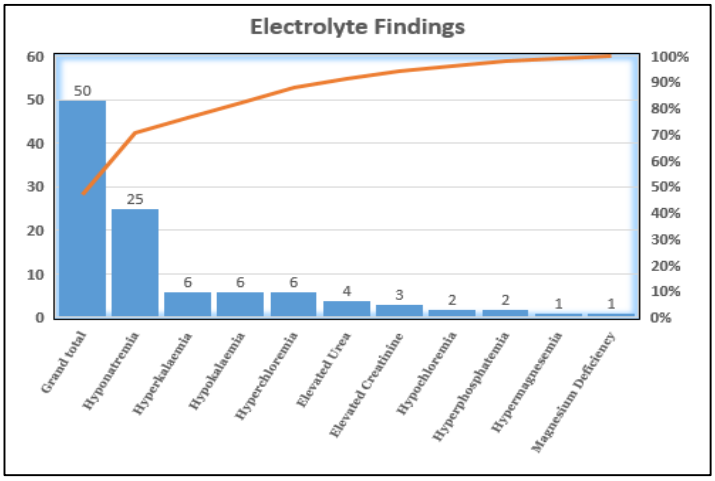
A Prospective observational study on 50 patients for the period of three months from Jan 2025 – April was conducted in Kauvery Hospital, Emergency department, Cantonment. All the data were interpreted, and the study reveals the importance of estimating the status of electrolytes at the Emergency Department. The significance of findings was tested and data interpreted.

### 1. Demographics of Emergency Patients on admission in Kauvery Cantonment

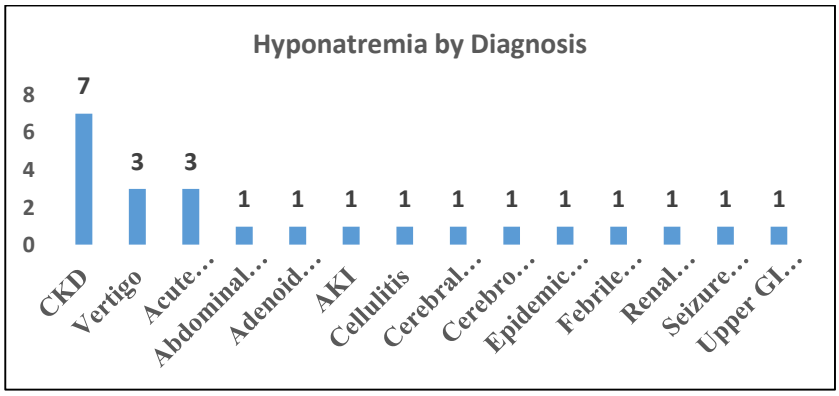


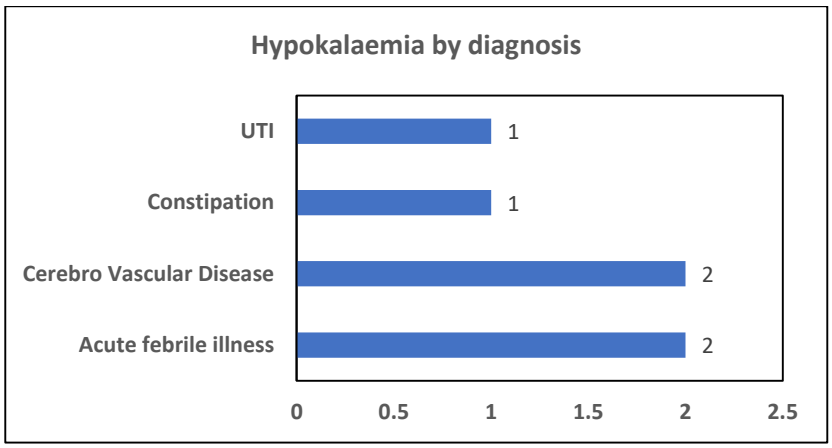

### 2. Electrolytes findings in Emergency patients in Kauvery Cantonment



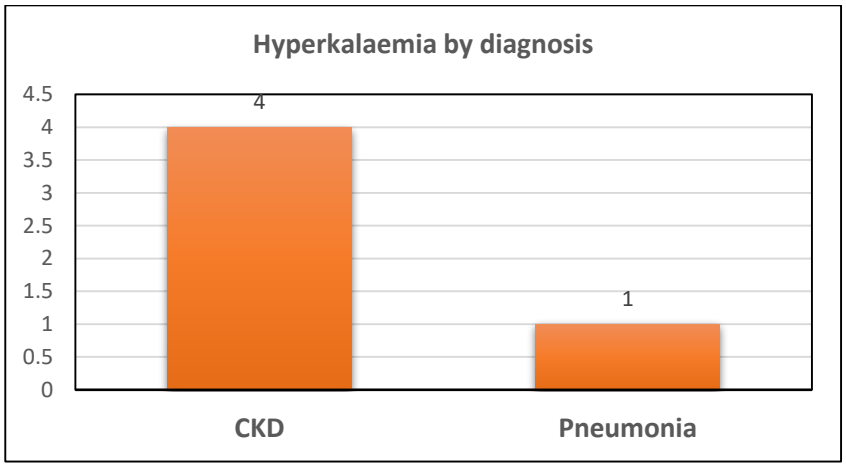
3. **Electrolytes findings and diagnosis of Emergency patients in Kauvery Cantonment**



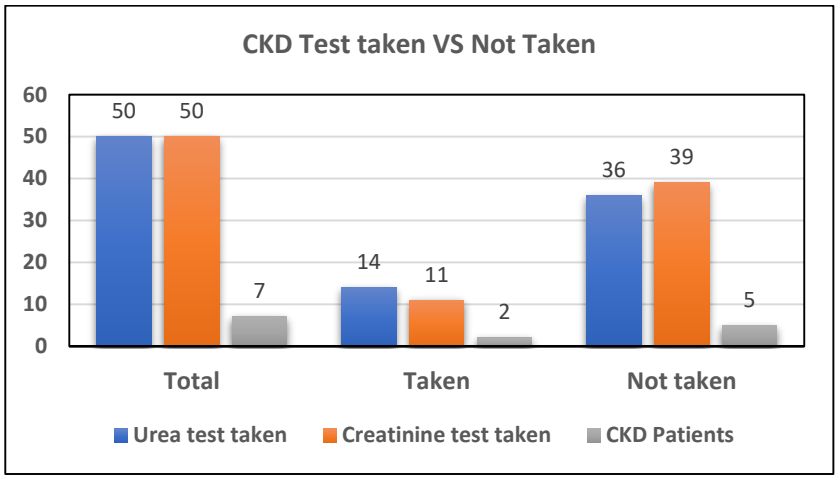

4. **Hypokalemia findings and diagnosis of Emergency patients in Kauvery Cantonment**



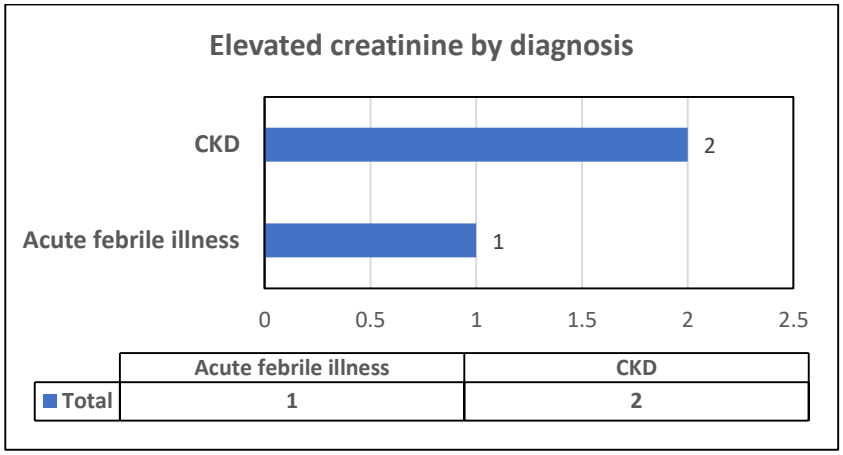

5. **Hyperkalemia findings and diagnosis of Emergency patients in Kauvery Cantonment**



**6. Creatinine and Urea taken for CKD patients in Emergency Department Kauvery Cantonment**




**7. Elevated Creatinine taken for CKD patients in Emergency Department Kauvery Cantonment**




## 3. Discussion

This prospective observational study conducted over a three- month period at the Emergency Department of Kauvery Hospital, Cantonment, highlights the importance of routine electrolyte testing in emergency care. Out of 50 patients evaluated, 50% exhibited one electrolyte abnormality, underscoring the clinical significance of early biochemical screening upon admission.

Most frequently observed electrolyte disturbances were Hyponatremia (14%), Hypokalaemia (12%), and Hyperkalaemia (10%). These findings are consistent with prior studies that report hyponatremia as the most common electrolyte disorder in actually ill patients, often due to fluid imbalance, renal dysfunction, and infections.

Electrolytes like urea and creatinine tests were not performed in a significant number of patients with CKD. Only 2 out of 7 CKD patients received both tests, indicating a gap in standard diagnostic protocol. This observation underscores the need to strengthen triage and diagnostic workflows to ensure appropriate testing in high risk patients.

Unexpected elevation of creatinine in acute febrile illness- causes like sepsis, dehydration, Rhabdomyolysis or drug effects. Elevated creatinine in febrile illness may indicate reversible AKI. Emphasis on early detection and management.

Clinical implication: need to evaluate kidney function even in non-CKD cases

Patient presenting with neurological symptoms such as seizures and vertigo were found to have hyponatremia, consistent with literature that identifies low serum sodium as a contributing factor to altered mental status, seizures and balance disturbances.

This study also found that electrolytes testing was performed in only 50% of patients, even though half of the total cohort and detectable abnormalities. This reflects potential underutilization of lab diagnostics, which could delay treatment decisions in a fast-paced emergency setting.

**4. Limitations**

The study was limited by its small sample size and single-centre design, which may affect generalizability. Additionally, not all patients underwent complete electrolyte testing, and long-term outcomes were not assessed.

**5. Conclusion**

This study highlights the high prevalence of electrolyte imbalances among patients presenting to the Emergency Department of Kauvery Hospital.

Electrolyte testing is often overlooked in emergency settings due to the prioritization of rapid stabilization. However, serum electrolytes are closely associated with physiological status of the patient and frequently reflect underlying systemic conditions. This study highlights that routine electrolyte evaluation can uncover critical imbalances linked to conditions such as CKD, Infections, and neurological disorders. Incorporating routine electrolytes testing in emergency protocols may aid in early diagnosis, guide condition- specific treatment, ultimately improve patient outcomes**.**

**6. Reference**

[1] Lee CT, Guo HR, Chen JB. Hyponatremia in the emergency department. Am J Emerg Med. 2000; 18:264–268. doi: 10.1016/s0735-6757(00)90118-9.

[2] Shiber JR, Mattu A. Serum phosphate abnormalities in the emergency department. J Emerg Med. 2002; 23:395–400. doi: 10.1016/s0736-4679(02)00578-4

[3] Bockenkamp B, Vyas H. Understanding and managing acute fluid and electrolyte disturbances. Current Paediatrics. 2003; 13:520–528.

[4] Ito H, Fujimaki H, Inoue J, Shiraki M. Disorders of fluid and electrolyte metabolism in elderly diabetics. Nihon Ronen Igakkai Zasshi. 1989; 26:233–239.

[5] Liamis G, Rodenburg EM, Holman A, Zietse R, Stricker BH, Hoorn EJ. Electrolyte disorders in community subjects: prevalence and risk factors. Am J Med. 2013;126(3):256–63. Epub 2013/01/22. 10.1016/j.amjmed.2012.06.037.

[6] Funk GC, Lindner G, Druml W, Metnitz B, Schwarz C, Bauer P, et al. Incidence and prognosis of dysnatremias present on ICU admission. Intensive Care Med 2010; 36:304-311.

[7] World Health Organizations. Emergency Triage Assessment (ETAT): Manual for participants. Geneva: WHO;2016.

[8] Palmer BF. Regulation of potassium homeostasis. ClinJ Am Soc Nephrol.205;10(6):1050-60