## ABSTRACT

**Introduction:** Critically ill patients with electrolyte imbalances face significant risks of mortality. Electrolyte imbalances can disrupt normal physiological processes, contribute to organ dysfunction, and cause death. This study aimed at ascertaining the predictors of mortality among critically ill Patients with electrolyte imbalances attending Mbarara Regional Referral Hospital Emergency Department.

**Methodology:** This was a prospective cohort study at the ED of MMRRH. Among 400 critically ill patients who were consecutively sampled between February 2023 and May 2023. 177 critically ill patients had electrolyte imbalances and were followed for 14 days to observe for mortality. Data on Socio-demographic, mortality, and baseline characteristics, were collected using a pretested interviewer-guided questionnaire. Descriptive statistics were presented for socio-demographic characteristics. The prevalence of electrolyte imbalance was presented as a proportion of the participants who had any electrolyte imbalance. Bivariate analyses were conducted and variables with $p<0.2$ and those that were biologically plausible were entered into multiple logistic regression model and Hazard ratios were reported with predictors of mortality considered at $p<0.05$. All analyses were done using Stata version 17.0.

**Results**: Of the 400 patients enrolled, 180(45%) had electrolyte imbalances bassline and 177 followed for 14 days. The commonest electrolyte imbalance was hyponatremia, 98(54.4%), hyperchloremia 64(36.2%), and hypokalaemia 48(27.1) respectively. Most patients 45(25%) experienced severe hyponatremia, mild hyperchloremia 30 (16.9) and mild hypokalaemia 30 (16.9). The incidence of mortality was 59.9% (n=106) and the median day of death was 3 with an interquartile range of 2-5. At multivariate analysis, a history of alcohol consumption AHR 2.0 (95% CI: 1.0-4.1, p- 0.04), referral in from other facilities 2.4 (95% CI: 1.1-5.3, p 0.024) and a comorbidity with heart failure 4.5(95% CI: 1.3-15.8, p 0.019) predicted higher incidence of mortality. However, Specialist involvement in the patient care AHR0.5(0.3-0.9) 95% CI, P-value of 0.022, pre-referral use of diuretics, Specific interventions on electrolyte imbalances and ward disposition at adjusted hazard ratio of 0.1(0.1-0.3) at 95% CI and P-Value 0f <0.001 were protective.

**Conclusion:** The prevalence of electrolyte imbalance in critically ill patients at MRRH ED is high, with the majority diagnosed with severe hyponatremia. A history of alcohol consumption, referral in from other facilities, and comorbidity with heart failure predicted a higher incidence of mortality.

Pre-referral diuretic use and/ or specific interventions on electrolyte imbalances at the ED, specialist involvement in patient care and ward disposition predicted survival of critically ill patients with electrolyte imbalance at MRRH ED.