

ORIGINAL ARTICLE

Frequency and Severity of Hyponatremia in Children Seeking Emergency Care

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ABSTRACT

Objective: To determine the frequency and severity of hyponatremia in children seeking emergency care at tertiary care Hospital.

Methodology: This cross-sectional study was done at Pediatric emergency civil Hospital Karachi from May 2012 to November 2012. All patients of either sex coming to pediatric emergency, ages from 2 months to 12 years who did not receive any treatment during this illness were included. All patients who met the inclusion criteria were evaluated for sodium concentration through serum sodium concentration. Informed consent was obtained from the parents or attendant. Data was analyzed using SPSS version 26.

Results: The mean age of enrolled participants was 4.1±2.7 year. Of 188 enrolled participants, 144 (76.6%) were male and 44 (23.4%) were female with a male to female ratio of 2.3:1, mean weight 12.87±3.5 kg and mean serum sodium level of 134.64±3.7mEq/L. The frequency of hyponatremia was in 61(32.4%) cases and out of these 61 patients, 18.9% had severe hyponatremia. The frequency of hyponatremia was statistically insignificant according to age and gender (p>0.05).

Conclusion: It was concluded that the frequency of hyponatremia in sick children presented to emergency department was 32.4%.

Key words: Hyponatremia, Children, Emergency department

INTRODUCTION

Children who are critically ill require, or may require, a high level of reliance, or significant consideration in medical, trauma or surgically linked health facility.¹ In addition, paediatric illnesses frequently increase the number of people who attend the Emergency Department (ED), resulting in a high percentage of ED visits.¹ All paediatric patients in the hospital wards, emergency department, Intensive Care Unit (ICU) or Neonatal Intensive Care Unit (NICU) who require and immediate attention. In critically unwell paediatric patients, electrolyte abnormalities are common and when present, they can have a substantial impact on a child's outcome.² Sodium, magnesium, calcium, potassium and phosphorus are the most critical electrolytes in these cases. Their imbalance in either direction, i.e. lower or higher than normal values, might influence cellular functions, affecting morbidity and mortality dramatically.² Whereas sodium homeostasis disturbances are a common electrolyte problem seen in unwell children requiring urgent care.³ Hyponatremia, which affects 3 percent to 30% of hospitalized patients, has been described.^{3,4} Irregularity can manifest itself in a variety of ways, resulting in death and morbidity.³⁻⁵ Acute hyponatremia puts the central nervous system in jeopardy right away. Brain edema is common as a result of the rapid fluid shifts associated with this illness.⁶ Children with pneumonia and bronchiolitis, the most prevalent disorders seen in paediatric general practice, are more likely to develop hyponatremia as a result of excessive anti-diuretic hormone (ADH) release.^{7,8} The prevalence of hyponatremia, the severity of it, and the time it takes to get

proper treatment appear to be the most important predictors of morbidity and mortality.³ Children with hyponatremia (defined as a sodium concentration of less than 130 mEq/L) had a 60-fold higher mortality rate than those who do not have hyponatremia.³ Hyponatremia is caused by a sodium deficiency or a water surplus.⁹ Hyponatremia is caused by a combination of factors including impaired water excretion, abnormal vasopressin release, the use of hypotonic drinks, salt and water redistribution, a number of medicines, and a primary illness. Hyponatremia and hypernatremia acquired in the intensive care unit are common in critically sick cases and are linked to a higher risk of hospital death.⁹ Due to inadequate national data, this study has been done to assess the frequency and severity of hyponatremia in children seeking emergency care at tertiary care Hospital.

MATERIAL AND METHODS

This descriptive cross-sectional hospital-based study was done at pediatric Emergency Civil Hospital Karachi from May 2012 to November 2012. Non probability Consecutive Sampling was used. All patients of either sex coming to pediatric emergency, ages from 2 months to 12 years who did not receive any treatment during this illness were included. All patients ages from < 2months and > 12 years who has taken any treatment during this illness were excluded. Informed consent was obtained from the parents or attendant. All the cases underwent blood sampling under antiseptic. All patients who meet the inclusion criteria were evaluated for sodium concentration through serum sodium concentration. Hyponatremia was defined as sodium

concentration <135 mEq/L¹ and further categorized as mild hyponatremia (Sodium concentration 134-131mEq/L²), moderate hyponatremia (Sodium concentration between 126-130mEq/L²) and severe Hyponatremia (Sodium Concentration <125 mEq/L²). Data were collected with the help of predesigned Performa which be filled by Pediatric Emergency doctor on duty, which includes the relevant information as primary diagnosis, serum sodium level, severity of hyponatremia. Data was analyzed using SPSS version 26.

RESULTS

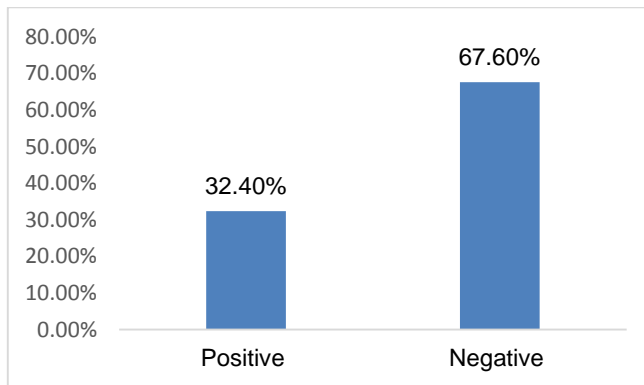
A total of 188 children were enrolled in this study during study period, their mean age of enrolled participants was 4.1±2.7 year and out of them 144 (76.6%) were male and 44 (23.4%) were female with male to female ratio of 2.3:1. Average weight 12.87±3.5 kg and mean serum sodium level of 134.64±3.7 mEq/L. Table.1

Overall frequency of hyponatremia was 61 (32.4%) cases. Out of these 61 hyponatremia patients, 18.9% had severe hyponatremia. Fig:1

The mean age of patients with hyponatremia was 4.48±2.9 years compared to 3.9±2.6 years in patients with normal sodium level (P-0.147). Among 144 male patients, 48 (33.3%) had hyponatremia compared to 29.5% in female patients (P-0.392). Table.2

Table 1. Descriptive statistics of demographic characteristics n=188

Variables	Statistics	
Age (years)	4.1±2.7	
Weight (kg)	12.87±3.54	
Serum sodium	134.64±3.72	
Gender	Males	144(76.6%)
	Females	44(23.4%)



Severity: Mild Moderate Severe
N=61 17(45.9%) 13(35.1%) 7(18.9%)

Fig 1: Frequency and severity of hyponatremia in paediatric study population (n=188)

Table.2 Frequency of hyponatremia according to age and gender n=188

Variables	Hyponatremia		p-value
	Yes n=61	No n=127	
Age (mean+SD) (years)	4.48±2.9	3.90±2.6	0.147
Gender	Males	48	0.392
	Females	13	

DISCUSSION

The commonest electrolyte imbalance detected in hospitalized children is hyponatremia. In this the mean age of enrolled participants was 4.1±2.7 year and out of them 144 (76.6%) were male and 44 (23.4%) were female with male to female ratio of 2.3:1. Similarly in the study of Naseem F et al² reported that the most of the cases 74.25% were less than 5 years and males were in majority 60.39% as compared to females 39.60%. On other hand Ali SH et al¹¹ reported that out of 150 Children males were 91 and 59 were females who were presented at the emergency pediatric unit and their mean age was 18.62±21.64 months. Consistently Mahapatra C et al⁷ reported that the study participants' average age was 1.88.41 years and males were commonest 63.2% as compared to females 36.8%.

In this study overall frequency of hyponatremia was 61 (32.4%) cases and 18.9% had severe hyponatremia. Although the Naseem F et al² demonstrated that the hyponatremia was 23.52%. On other hand Paidy AR et al⁹ in their study, the incidence rate of hyponatremia was 16.80% percent. Mahapatra C et al⁷ found a higher incidence of hyponatremia among 136 (58.9%) cases, followed by mild hyponatremia accounted for 83.8 percent of all hyponatremia cases, whereas moderate and severe hyponatremia accounted for 13.2 percent and 2.9 percent of all hyponatremia cases, respectively. In this the mean age of patients with hyponatremia was 4.48±2.9 years compared to 3.9±2.6 years in patients with normal sodium level (P-0.147). Among 144 male patients, 48 (33.3%) had hyponatremia compared to 29.5% in female patients (P-0.392). Similarly, Sakellaropoulou et al¹² discovered no statistically significant differences in the gender distribution of hyponatremia in children. Although inconsistently Mahapatra C et al⁷ stated that the that girl had a considerably higher risk of hyponatremia than males. On other hand it stated that there was no significant correlation between the study population's sex preference and the prevalence of hypo and hypernatraemia.⁹ The most prevalent electrolyte anomaly encountered in the intensive care unit (ICU) is hyponatremia, which is linked to an increased risk of morbidity and mortality. Because of decreased renal free water excretion and exogenous sources of excess free water intake, critically unwell children with bronchiolitis are at risk of hyponatremia.¹³ Despite the fact that a higher percentage of hyponatremic patients were intubated, they did not require longer ventilatory periods than the cases having normal level of sodium. In a separate study of intubated individuals, hyponatremia was shown to have the same ventilatory requirements as those without.¹³ This lack of negative consequences could be due to careful monitoring of serum sodium levels.¹⁴ Hyponatremia is more common in juvenile critical care patients due to their critical clinical status and related comorbidities.¹⁵

CONCLUSION

As per study conclusion the hyponatremia was observed to be higher 32.4% among children seeking emergency care. It observed statistically insignificant according to age and gender.

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