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Research Article

**FREQUENCY, ETIOLOGY, OUTCOME OF
HYPONATREMIA AT TERTIARY CARE HOSPITAL****Dr. Mukhtiar Hussain Jaffery^{1*}, Dr. Akber Yousfani¹, Dr. Farzana Shaikh²,
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Jamshoro² Department of Pediatrics Liaquat University of Medical and Health Sciences (LUMHS)³ General Practitioner Zulekha Hospital, Dubai United Arab Emirates⁴ Brandon Regional Hospital, Brandon, Florida, U.S.A**Received:** 30 March 2017**Accepted:** 11 April 2017**Published:** 18 April 2017**Abstract:****OBJECTIVE:** To determine the frequency, etiology, outcome of hyponatremia at tertiary care hospital**PATIENTS AND METHODS:** The one year cross sectional survey was conducted from 01 January 2015 to 31 December 2015 at tertiary care hospital Hyderabad. The inclusion criteria of the study were hospitalized patients due to any illness for ≥ 07 days, of ≥ 12 years of age either gender were recruited. The serum sodium levels was checked at admission, every day during and then as and when indicated and the serum sodium value < 130 mmol/l was labeled as low or hyponatremia while the value < 125 mmol/l was labeled as severe hyponatremia. The frequency and percentages (%) was computed while the mean \pm SD for also calculated for numerical variables.**RESULTS:** Total 87 hyponatremic individuals were rationalized during one year study period. The mean \pm SD for age and serum sodium level for whole population was 58.97 ± 8.64 and 127.31 ± 3.52 respectively. The treatment was initialized. The symptomatic patients were managed by IV hypertonic saline with rate and dose calculation followed by oral salt supplementation. Ten patients (19%) hyponatremic subjects expired during hospitalization whereas no any case of central pontine myelinolysis was detected in our study population. The hyponatremia was identified in 52 (59.7%) with male gender predominance 32 (61.5%). The common etiological factors detected were GI fluid loss 12 (13.8%), CVA 10 (11.5%), lungs abscess 11 (12.6%) and renal failure 10 (11.5%) respectively. The mild, moderate and severe hyponatremia was detected in 17 (32.7%), 24 (46.2%) and 11 (21.2%).**CONCLUSION:** Hyponatremia is fairly common in patients admitted in emergency wards**Keywords:** Hyponatremia, Sodium, Electrolytes**Corresponding author:****Dr. Mukhtiar Hussain Jaffery,**

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INTRODUCTION:

Disorders of sodium metabolism is common in hospitalized and outpatients subjects and can responsible for morbidity and mortality. [1] Serum sodium concentration and plasma osmolarity usually maintained under homeostatic mechanisms i.e. thirst, antidiuretic hormone (ADH), and kidney function. [2, 3] Approximately 40% of the body's sodium existing in bone and about 2-5% occurs within organs and cells and the remaining 55% exist in blood plasma and other extra cellular fluids. [4] The amount of sodium in blood plasma is 140mmol/L and its asymmetric distribution is essential for human life. [5, 6] The element is responsible for proper nerve conduction, osmosis and diffusion and the blood pressure regulation. [7] The age-related alterations and chronic diseases are often associated with impairment of solute metabolism in hospitalized patients and essential to be aware about pathophysiology of sodium changes in the hospitalized patients. [8,9] The renal function, sensation of thirst, concentrating abilities and hormonal regulation of water and solutes are usually impaired in hospitalized patients which makes such individuals susceptible to alterations in serum sodium and water. [10] A systematic approach in evaluating the root cause, detail history and relevant physical examination, and specific laboratory investigations are necessary to make the clinical diagnosis. [11, 12] Furthermore, iatrogenic interventions and lapses in nutrition and nursing care frequently responsible for homeostatic balance in hospitalized subjects, particularly prolonged bed ridden patients. [13, 14] Therefore, by considering it, the study was planned to conduct at tertiary care teaching hospital which evaluate the serum sodium level in ill hospitalized patients, so that proper treatment can be planned as early evaluated and management can save the individuals to acquire life threatening complications associated with electrolyte imbalance as far as sodium homeostasis is concerned.

PATIENTS AND METHODS:

The one year cross sectional survey was conducted from 01 January 2015 to 31 December 2015 at tertiary care hospital Hyderabad. The inclusion criteria of the study were hospitalized patients due

to any illness for ≥ 07 days, of ≥ 12 years of age either gender were recruited while the exclusion criteria of the study were patients already on intravenous fluid therapy, primary and secondary hyperaldosteronism, addison's disease, already on salt containing or diuretic therapy and pregnant ladies. The detail history was taken, relevant examination was performed and all baseline and specific investigations i.e. blood and urine tests as complete blood count, electrolytes, liver and renal function tests, urine examination, chest radiograph and other imaging studies were advised accordingly. The serum sodium levels was checked at admission, every day during and then as and when indicated and the serum sodium value <130 mmol/l was labeled as low or hyponatremia while the value <125 mmol /l was labeled as severe hyponatremia. When the electrolytes reports are available, patients are enrolled in the study if they are having serum sodium less than 125mmol/L and the plasma and urine sample are sent for measurement of serum osmolality and urine osmolality. Serum electrolytes and urine spot sodium are measured by ion sensitive electrode method. Based on the type and severity of hyponatremia the patients are started on hyponatremia correction therapy outcome of treatment was also recorded. The data was saved on pre-designed proforma and analyzed in SPSS 16. The frequency and percentages (%) was computed while the mean \pm SD for also calculated for numerical variables.

RESULTS:

Total 87 hyponatremic individuals were rationalized during one year study period. The mean \pm SD for age and serum sodium level for whole population was 58.97 ± 8.64 and 127.31 ± 3.52 respectively. The treatment was initialized. The symptomatic patients were managed by IV hypertonic saline with rate and dose calculation followed by oral salt supplementation. Ten patients (19%) hyponatremic subjects expired during hospitalization whereas no any case of central pontine myelinolysis (CPM) was detected in our study population. The results of the study are presented in Table 1-6.

TABLE 1: THE AGE AND GENDER DISTRIBUTION OF POPULATION

AGE (yrs)	GENDER		Total
	Male	Female	
12-19	9	0	9
	16.4%	.0%	10.3%
20-29	8	5	13
	14.5%	15.6%	14.9%
30-39	14	7	21
	25.5%	21.9%	24.1%
40-49	13	10	23
	23.6%	31.2%	26.4%
50 +	11	10	21
	20.0%	31.2%	24.1%
Total	55	32	87
	100.0%	100.0%	100.0%

TABLE 2: THE AGE AND FREQUENCY OF HYPONATREMIA IN STUDY POPULATION

AGE (yrs)	HYPONATREMIA		Total
	Yes	No	
12-19	5	4	9
	9.6%	11.4%	10.3%
20-29	12	1	13
	23.1%	2.9%	14.9%
30-39	21	0	21
	40.4%	.0%	24.1%
40-49	12	11	23
	23.1%	31.4%	26.4%
50 +	2	19	21
	3.8%	54.3%	24.1%
Total	52	35	87
	100.0%	100.0%	100.0%

TABLE 3: THE GENDER AND HYPONATREMIA

GENDER	HYPONATREMIA		Total
	Yes	No	
Male	32	23	55
	61.5%	65.7%	63.2%
Female	20	12	32
	38.5%	34.3%	36.8%
Total	52	35	87
	100.0%	100.0%	100.0%

TABLE 4: THE ETIOLOGY IDENTIFIED FOR HYPONATREMIA

ETIOLOGY	GENDER		Total
	Male	Female	
GI fluid loss	7	5	12
	12.7%	15.6%	13.8%
Cerebrovascular accident	8	2	10
	14.5%	6.2%	11.5%
Lung abscess	8	3	11
	14.5%	9.4%	12.6%
Renal failure	6	4	10
	10.9%	12.5%	11.5%
Multi-factorial	6	4	10
	10.9%	12.5%	11.5%
Congestive Cardiac Failure	5	3	8
	9.1%	9.4%	9.2%
Malignancy	5	3	8
	9.1%	9.4%	9.2%
Pulmonary tuberculosis	5	3	8
	9.1%	9.4%	9.2%
Meningitis	3	2	5
	5.5%	6.2%	5.7%
Chronic liver disease	1	2	3
	1.8%	6.2%	3.4%
Nephrotic syndrome	1	1	2
	1.8%	3.1%	2.3%
Total	55	32	87
	100.0%	100.0%	100.0%

TABLE 5: THE ETIOLOGY AND FREQUENCY OF HYPONATREMIA

ETIOLOGY	HYPONATREMIA		Total
	Yes	No	
GI fluid loss	3 5.8%	9 25.7%	12 13.8%
Cerebrovascular accident	4 7.7%	6 17.1%	10 11.5%
Lung abscess	6 11.5%	5 14.3%	11 12.6%
Renal failure	9 17.3%	1 2.9%	10 11.5%
Multi-factorial	10 19.2%	0 .0%	10 11.5%
Congestive Cardiac Failure	8 15.4%	0 .0%	8 9.2%
Malignancy	6 11.5%	2 5.7%	8 9.2%
Pulmonary tuberculosis	3 5.8%	5 14.3%	8 9.2%
Meningitis	2 3.8%	3 8.6%	5 5.7%
Chronic liver disease	1 1.9%	2 5.7%	3 3.4%
Nephrotic syndrome	0 .0%	2 5.7%	2 2.3%
Total	52 100.0%	35 100.0%	87 100.0%

TABLE 6: THE GENDER AND SEVERITY OF HYPONATREMIA

SEVERITY	GENDER		Total
	Male	Female	
Mild	11 34.4%	6 30.0%	17 32.7%
Moderate	15 46.9%	9 45.0%	24 46.2%
Severe	6 18.8%	5 25.0%	11 21.2%
Total	32 100.0%	20 100.0%	52 100.0%

DISCUSSION:

Hyponatremia is responsible for morbidities and mortality worldwide and the present study was hospital based cross-sectional study to evaluate the hyponatremias. The reported prevalence for hyponatremia in hospitalized patients in former studies is 12- 14%, with severe hyponatremias 1–2%. [16, 17] In the study by Laczi F, it was 15-30% respectively.[3] In our study it was detected as 59% with male gender predominance 59.7%. [18] The variation is might be due to tropical atmospheric conditions and malnutrition observed in majority of our study population. The former study by Chakrapani M, et al observed an increased incidence of hyponatremia during monsoon weather. [19] In our study, GI fluid loss, cerebrovascular accident, lung abscess, renal failure and congestive cardiac failure were the most etiological factors observed. The findings are consistent with the study by Biswas M, et al and Yawar A, et al. [20, 21]The importance of early detection of hyponatremia and prompt intervention is necessary. [22] In a former multicentric trial with 151,486 patients, the dysnatremias were responsible for hospital mortality rates. Furthermore, apart from mortality, hyponatremia lengthening the hospital stay and increases the cost of medical care substantially. [23] It is important to note that patients with even mild hyponatremia, can predisposed to acquire severe hyponatremias and can leads to life threatening outcomes like myocardial infarction.[24,25] In present study, the mortality rate was detected as 10/52 (19 %) for hyponatremic patients, of which 60% were male and 40% were female. The observation is consistent with the study by Gill G, et al. [26] Regarding the severity of hyponatremia, the Singapore study shown 36% patients with mild hyponatremia, 5% with moderate hyponatremia and 1.2% had severe hyponatremia) [27] where as in present study the mild, moderate and severe hyponatremia was shown in 11 (34.4%), 15 (46.9%) and 6 (18.8%) patients respectively. The management of hyponatraemia includes identification of root cause and treatment of the underlying condition. [28] Severe hyponatraemia should be treated on priority basis and as a medical emergency and the restriction of fluid is the initial treatment of choice in majority individuals while the urgent treatment is required in severe hyponatraemia. Moreover long term follow up also required for risk stratification, subsequent morbidity and quality of life in subjects who were discharged from hospital.

CONCLUSION:

Hyponatremia is fairly common in patients admitted in emergency wards. Majority of the patients are asymptomatic and in-hospital mortality and morbidity is observed to be higher in

hyponatremia individuals. Therefore, early identification and prompt treatment are of great importance in those patients.

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