



General Medicine

A PROSPECTIVE OBSERVATIONAL STUDY OF INCIDENCE AND ETIOLOGY OF HYPONATREMIA IN HOSPITALIZED PATIENTS

Dr Shweta Deepak Gajare*

DNB Medicine Resident at Tirath Ram Shah Hospital, Delhi. *Corresponding Author

Dr Dinesh Kumar Singh

Head of the department and Senior consultant department of General Medicine at Tirath Ram Shah Hospital, Delhi

ABSTRACT Hyponatremia is one of the most common electrolyte disorders, defined as sodium levels <135 mEq/L. Serum sodium was checked for 900 hospitalised patients aged ≥ 18 years in department of general medicine at Tirath Ram Shah hospital, Delhi. 148 patients had hyponatremia. Prevalence and etiological causes of hyponatremia were assessed in the hospitalised patients. In this study, prevalence of hyponatremia was found to be 16.4% of which 58.8% were male and 41.2% were female. Mean age was 62.3 ± 16.0 years. 50 % patients were asymptomatic, nausea (21.6%) and vomiting (20.9%) were the most common symptoms. 4.7% of the patients had severe symptoms like seizures. Severe hyponatremia was observed mostly in elderly patients compared to mild and moderate hyponatremia (68.1 ± 11.3 , vs 58.2 ± 18.1 and 64.2 ± 13.4 , respectively, $p < 0.01$). SIADH was found to be the most common etiology (51.4%). Early etiological diagnosis of hyponatremia and appropriate interventions help prevent the prolonged hospital stay and leads to a favourable outcome. This further reduces economic burden and optimizes hospital resource utilization.

KEYWORDS : Hyponatremia, SIADH, Osmolality, ADH**INTRODUCTION:**

Hyponatremia is a common, often underreported electrolyte abnormality, defined as <135 mEq/L [1]. The prevalence of hyponatremia ranges from 5.5% to 38%, reaching up to 40-50% in elderly patients [2,3]. Incidence of hyponatremia ranges from 15% to 30%, it can reach up to 40-50% in elderly patients [4]. Higher incidence is encountered in elderly patients due to age related changes in glomerular filtration rate (GFR), multiple co-morbidities and polypharmacy [1]. Hyponatremia is a disorder of water imbalance. Sodium disorders are mostly associated with imbalance in water homeostasis, antidiuretic hormone (ADH) secretion and renal handling of filtered sodium [1]. In the hospitalized patients, sodium and water disturbances are common in critical illness or are often iatrogenic [5]. One of the most common causes being SIADH. Other common causes include drug induced (commonly diuretics), adrenal insufficiency, hypovolemia, heart failure and liver diseases [1,5]. Most of the patients with hyponatremia are asymptomatic, commonly present with nausea, vomiting, giddiness, and lethargy. Abnormal behaviour, seizures, drowsiness can be seen mostly in cases of severe hyponatremia, it can also lead to coma and death [4]. It is important to see if the hyponatremia is acute or chronic, acute hyponatremia needs aggressive correction especially if symptomatic [4].

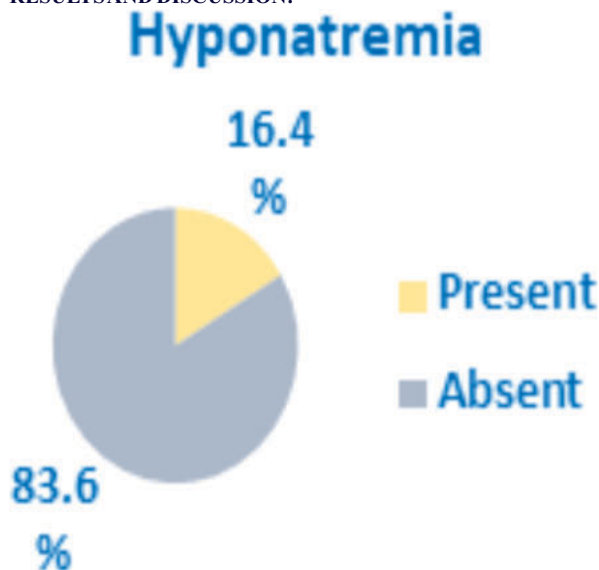
RESULTS AND DISCUSSION:

Figure: 1 Pie Chart Showing Distribution Of The Study Participants According To Prevalence Of Hyponatremia (n=900)

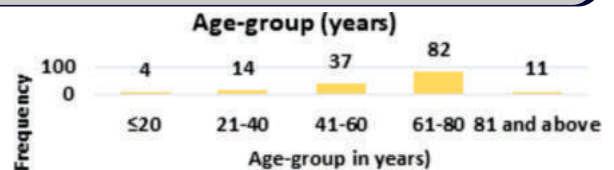


Figure 2: Bar Chart Showing Distribution Of Hyponatremia According To Age Group (n=148)

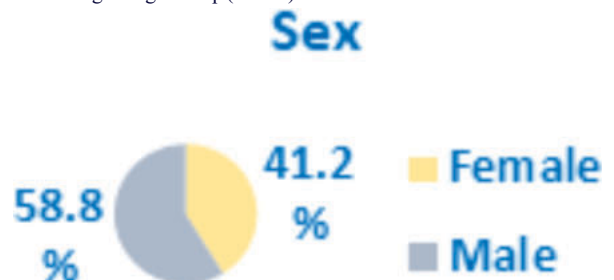


Figure 3: Pie Chart Showing Distribution Of Hyponatremia Patients According To Sex

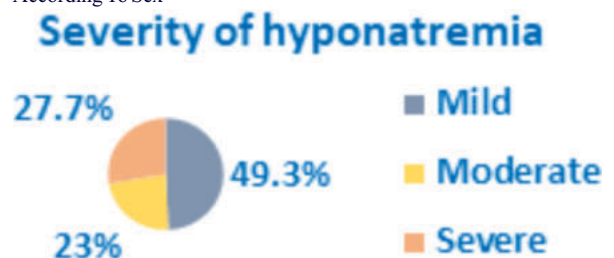


Figure 4: Pie Chart Showing Distribution Of Hyponatremia Patients According To Severity (n=148)

Table 1: Distribution Of Hyponatremia Patients According To Etiology (n = 148)

Etiology of hyponatremia		Frequency	Percentage (%)
SIADH	Infectious diseases	42	28.3
	Drug induced	9	6.0
	Respiratory diseases	9	6.0
	Malignancy	7	5.0
	Stress/trauma	7	5.0
	Hypovolemia	2	1.1
Total		76	51.4
Non-SIADH	Endocrinal disorder	18	12.1
	GI fluid loss	17	11.0

	Chronic liver diseases	10	6.7
	Drug induced	8	5.0
	Cardiac diseases	7	4.8
	Dengue	4	3.0
	Renal diseases	4	3.0
	Pancreatitis	3	2.0
	Trauma	1	1.0
	Total	72	48.6
Total		148	100.0

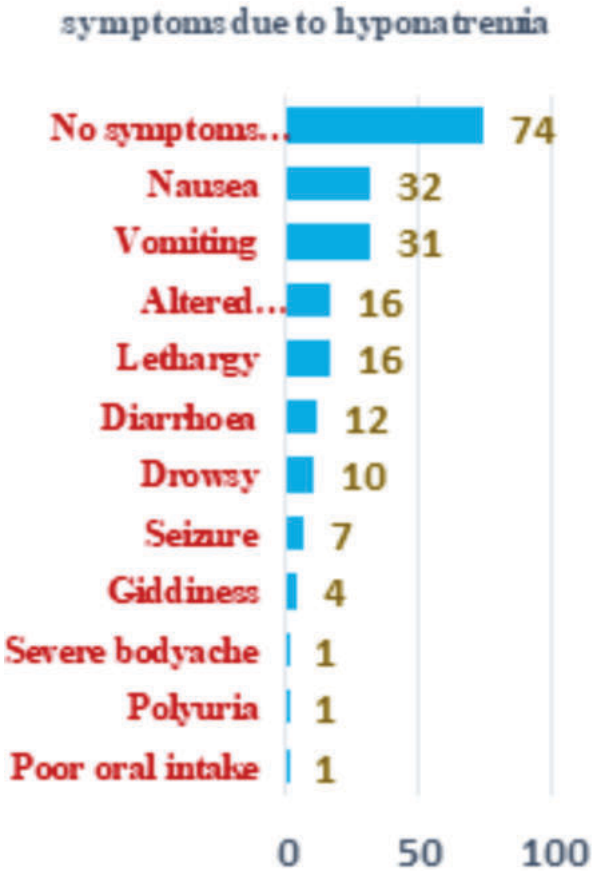


Figure 5: Bar Chart Showing Distribution Of The Study Participants According To Their Symptoms Due To Hyponatremia (n = 148)

Table 2: Factors Associated With Severity Of Hyponatremia (n = 148)

Variables	Severity of hyponatremia			Kruskal-Wallis test ^a	
	Mild N=73	Moderate N=34	Severe N=41	Test statistic	p value
	Mean ± SD				
Age	58.2±18.1	64.2 ±13.4	68.1±11.3	9.1	0.01*
Serum sodium	132.1±1.4	127.8±0.94	119.8±4.6	125.3	0.000*
Urine osmolality	347.3±56.8	333.1±57.2	332.9±92.5	2.3	0.32
Serum osmolality	263.6±10.3	256.4±12.5	252.8±15.2	21.9	0.000*
Urinary sodium	40.1±14.8	39.0±30.4	36.1±27.2	5.5	0.065
Urinary potassium	29.0±9.7	26.9±11.1	25.7±14.9	4.0	0.133
TSH	2.8±1.2	9.3±39.7	2.6±1.2	1.9	0.371
Serum cortisol	13.4±4.4	11.7±4.1	11.9±8.1	7.5	0.023*
Random blood sugar	125.0±32.1	122.9±27.1	126.2±30.3	0.1	0.961

^aStatistically significant
[#]Non parametric test was applied as the data was not normally distributed

Table 3: Comparison Of Etiology With Severity Of Hyponatremia (n = 148)

Etiology of hyponatremia	Severity of hyponatremia				Pearson Chi-Squared value	p value
	Mild	Moderate	Severe	Total		
NON-SIADH	26	19	27	72	10.53	0.005*
	35.6%	55.9%	65.9%	48.6%		
SIADH	47	15	14	76		
	64.4%	44.1%	34.1%	51.4%		
Total	73	34	41	148		
	100.0%	100.0%	100.0%	100.0%		

^{*}Statistically significant

Serum sodium was checked for 900 consecutive patients (≥18 years) admitted in medicine department at TRSCH, of which 148 patients had hyponatremia. Patient with pseudohyponatremia, defined as serum osmolality (275 – 290 mOsm/kg) were excluded. Patients were clinically examined to check volume status and other relevant findings contributing to the etiology. Serum sodium, serum osmolality, urine osmolality and urine sodium were measured to establish the etiology further. Prevalence of hyponatremia in this study was 16.4%.

Comparison of prevalence with different studies

Studies	proportion
Present study	16.4%
Lokesh et al ^[8]	18.9%
Chatterjee et al ^[1]	16.4%
Gosch et al	16.7%
Waiker et al	14.5%

In this study average age was 62.3±16.0 years. In Hawkins et al^[1] average age was 55 years with 43% >60 years and 23% >70 years. Another study by Win S et al^[9] showed 56% patients >65 years of age. In our study, hyponatremia was more common in males (58.8%) as compared to females (41.2%). In a study by Chatterjee et al^[1] out of 201 patients of hyponatremia 126 patients were male and 75 patients were female. In our study, among the mild hyponatremia patients, 64.4% patients had SIADH related etiology, 44.1% in moderate cases and 34.1%, that is lowest in severe hyponatremia group. Severe hyponatremia patients had highest non SIADH related (65.9%) patients followed by 55.9% in moderate group and 35.6% in mild group (35.6%). These differences were found statistically significant (p=0.005).

In this study, severe hyponatremia was seen mostly in elderly patients compared to mild and moderate hyponatremia (68.1±11.3, vs 58.2±18.1 and 64.2 ±13.4 respectively, p < 0.01). Miller, M., et al studied 119 elderly (≥ 60 years), 18 % of whom were found to have hyponatremia in contrast with age-adjusted ambulatory patients prevalence of 8%. In our study most of the patients were asymptomatic. Symptomatic patients had mostly neurological symptoms like altered behaviour, drowsiness and seizures were found in severe hyponatremia patients. In 2019 a study by Jain, A. K et al^[11] 100 consecutive elderly patients of hyponatremia were studied, of which 81% were symptomatic. 50% of these presented with lethargy followed by drowsiness (40%) and abnormal behaviour (39%). Profound hyponatremia, defined as <125 mEq/L was seen in 51% patients.

In the present study, SIADH was the most common aetiology found in 51.4% of the patients. Our result was consistent with Jain A. K. et al^[11] which recorded SIADH as the most common cause in 36% patients followed by drug induced aetiologies (26%). Lokesh et al^[6] states the most common aetiology as SIADH, followed by diuretics and dehydration seen in 28%, 15% and 12% patients respectively. A literature review^[1] on hyponatremia in infectious diseases stated the hyponatremia was found commonly in patients with viral pneumonia (17.6%) and bacterial pneumonia (13.8%). Hyponatremia was independently associated with disease severity and longer hospital stay. In elderly patients (≥ 65 years) hypopituitarism should be considered seriously^[1]. Ishikawa et al^[1] reported elderly hyponatremia patients had pituitary adrenal dysfunction. Thus secondary adrenal dysfunction should be closely evaluated.

CONCLUSION:

Hyponatremia is one of the most common electrolyte abnormality.

Hyponatremia is commonly seen in elderly patients and those on multiple drug therapy. Hence, hyponatremia should be strongly suspected and screened among these patients. Hyponatremia is associated with cognitive impairment, gait disturbance and increased risk of fall and fractures, especially in elderly patients. It is also associated with secondary osteoporosis. Most crucial step in the management of hyponatremia is treating the underlying cause. Hence, establishing the etiology facilitates early and appropriate management, ultimately improving patient outcomes. Many studies have discussed the need for early management of hyponatremia to improve prognosis. Even mild hyponatremia, when associated with an underlying primary disease, serves as a marker of poor prognosis and is associated with increased morbidity and mortality. Early etiological diagnosis and appropriate interventions help prevent the prolonged hospital stay and leads to a favourable outcome. This further reduces economic burden and optimizes hospital resource utilization.

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