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OUTCOME OF HYPONATREMIA IN CRITICALLY ILL PATIENTS

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Abstract

Background: *Hyponatremia is a condition when serum sodium is <135 and is considered severe when <120 mEq/L. It can be due to abnormal sodium or water balance. It is the most common electrolyte disorder occurring in critically ill patients[1]. Symptoms range from nausea and malaise, with mild reduction in sodium, to lethargy, decreased level of consciousness, headache and if severe seizures and coma.* ***Aims:*** *This retrospective study was carried to find out the epidemiology, aetiology and clinical symptoms and outcome in critically ill patients admitted with hyponatremia in intensive care unit.* ***Method:*** *Patients with head injury, post-operative patients, patient on renal replacement therapy and age less than 18 years were excluded.* ***Results:*** *Hyponatremia is common in elderly male. Drowsiness is the commonest [45%] symptoms. most common type of hyponatremia is euvolemic hyponatremia [58%]. SIADH is the commonest cause of hyponatremia followed by sepsis [15%].* ***Conclusion:*** *Hyponatremia is common in elderly male. Severity of hyponatremia increases as the age advances. Drowsiness is the commonest symptoms. Seizures are present only in severe hyponatremia. Overall, commonest cause of hyponatremia is SIADH.*

Keywords: *Outcome, Hyponatremia. Critical Ill*

INTRODUCTION:

Hyponatremia is a common electrolyte disturbance occurring in critically ill patients.[1] Hyponatremia is defined as a serum sodium concentration of <135 mmol/l after the exclusion of pseudo-hyponatremia in most cases.

Symptoms range from nausea, malaise, lethargy, decreased level of consciousness, headache, seizures and coma. Mild Hyponatremia is asymptomatic, but sometimes it is severe, with sodium concentration less than 120 mmol/l.

Severe hyponatremia is a serious medical condition, which is associated with substantial neurological complications and mortality. Hyponatremia can be associated with low, normal, or high tonicity.[2]

A common clinical problem, hyponatremia frequently develops in hospitalized patients. A thorough understanding of aetiology of hyponatremia is required to devise preventive as well as management measures.[3]

Classification of Hyponatremia:

Severity	Serum sodium range[mEq/L]
Mild	130-135
Moderate	125-129
Severe	<125

Hyponatremia can be classified on the basis of serum osmolality, volume status and urinary sodium into hypertonic, isotonic and hypotonic types. Hypotonic hyponatremia is further classified into hypervolemic, euvolemic and hypovolemic as follows:[4]

- Hypovolemic hyponatremia: decreased total body sodium and decreased total body water. the sodium deficits exceeding water deficit.
- Euvolemic hyponatremia: normal body sodium with increase in total body water.
- Hypervolemic hyponatremia: increase in total body sodium with greater increase in total body water

The treatment of hyponatremia depends on the duration of hyponatremia and volume status of the patients. There are serious neurological sequelae if hyponatremia is inappropriately treated.

This study was done to find out the aetiology and the clinical symptoms in critically ill patient admitted to the ICU with hyponatremia.

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AIMS AND OBJECTIVEs

To study the epidemiology, aetiology, clinical manifestations and outcome of critically ill patient admitted with hyponatremia in intensive care unit.

MATERIAL AND METHODS

This is a retrospective study of 100 patient in intensive care unit in a tertiary care hospital over a period of 1 year. Patients' data were collected from case records. Relevant investigations considered: baseline random blood sugar, urea, creatinine, fasting lipid profile, urine osmolality, serum osmolality, urinary sodium, serum TSH, serum potassium.

INCLUSION CRITERIA

Patients more than 18 years of age admitted in ICU with serum sodium level less than or equal to 135 mEq/L

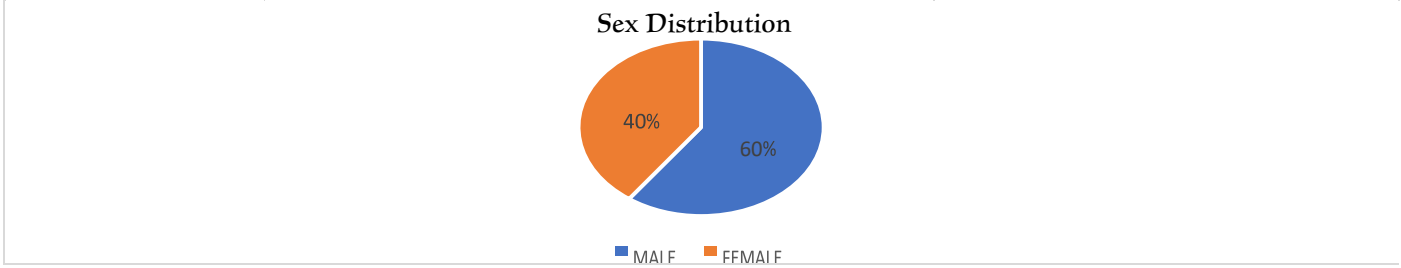
EXCLUSION CRITERIA

Patients with age less than 18 years, post-operative patients, head injury, patient on renal replacement therapy, patient with hyperlipidaemia, paraproteinemia[pseudohyponatremia], and those receiving mannitol, radiocontrast agents, or having hyperglycaemia.

RESULTS

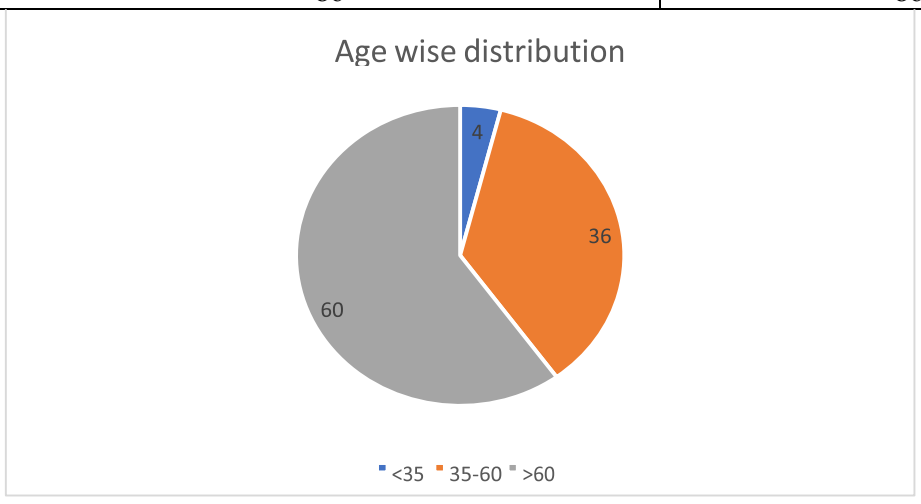
1. DISTRIBUTION OF PATIENT ACCORDING TO SEX

Sex	Percentage [%]
Male	60
Female	40



2. DISTRIBUTION OF PATIENT ACCORDING TO AGE

SR NO.	AGE GROUP [IN YEARS]	PERCENTAGE [%]
1.	<35	04
2.	35-60	36
3.	>60	60



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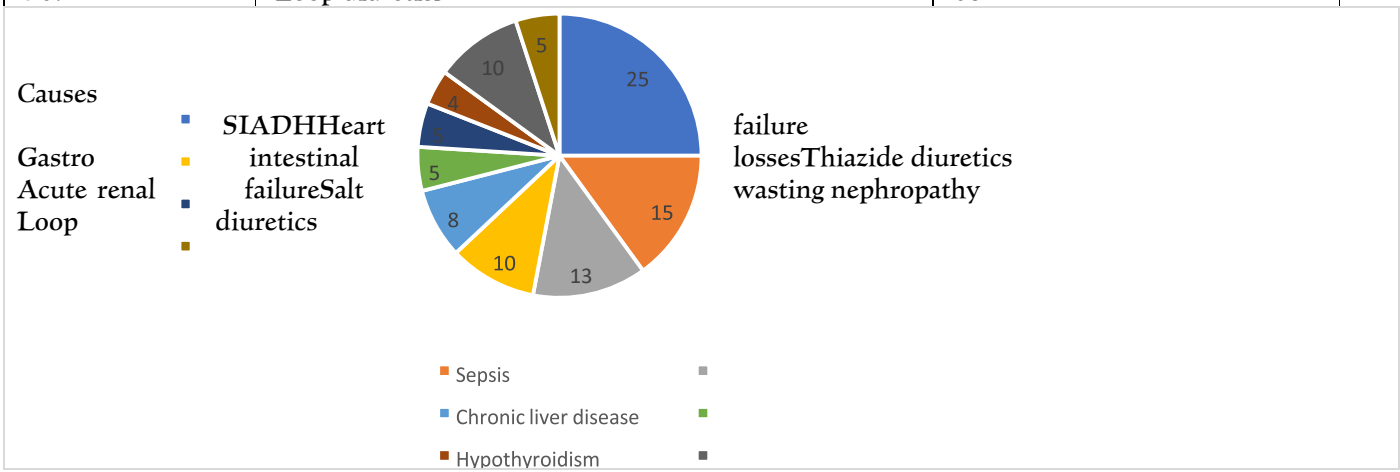
Elderly male are more commonly affected.

3. DISTRIBUTION OF PATIENT ACCORDING TO CAUSES OF HYPONATREMIA

SR NO.	CAUSES	Percentage [%]
1.	SIADH	25
2.	Sepsis	15
3.	Heart failure	13
4.	Gastro intestinal losses	10
5.	Chronic liver disease	08
6.	Thiazide diuretics	05
7.	Acute renal failure	05
8.	Hypothyroidism	04
9.	Salt wasting nephropathy	10
10.	Loop diuretics	05



4. DISTRIBUTION OF PATIENT ACCORDING TO SYMPTOMS OF HYPONATREMIA

SR NO.	SYMPTOMS	PERCENTAGE [%]
1.	Drowsiness	45
2.	Confusion	22
3.	Unresponsiveness	10
4.	Nausea /vomiting	10
5.	Hiccough	08
6.	Seizures	05

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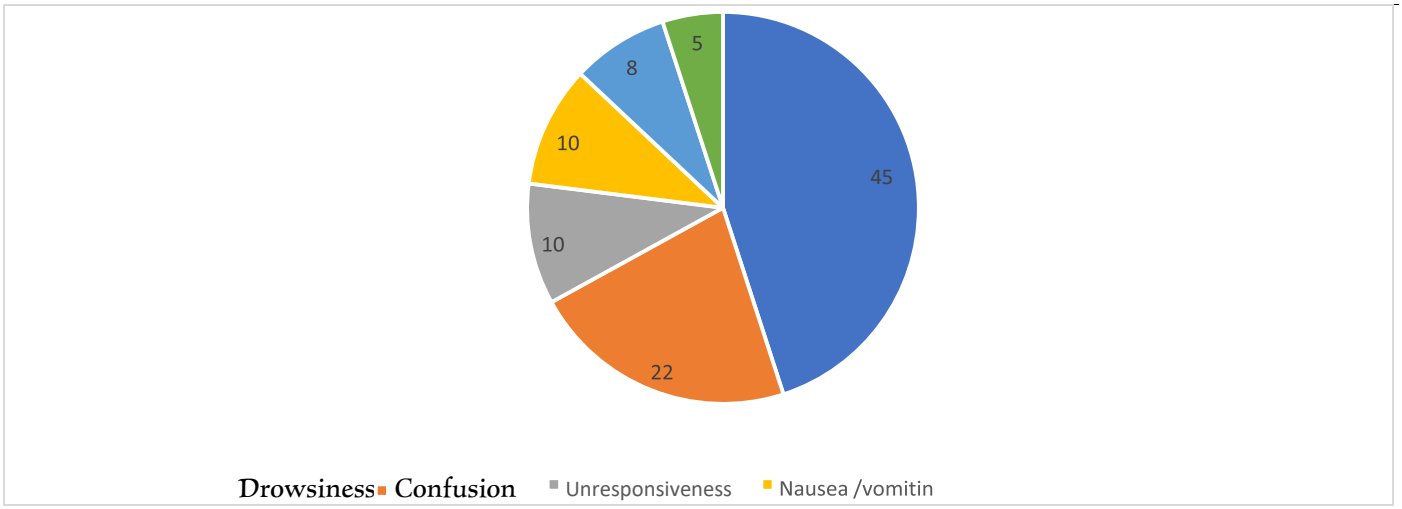
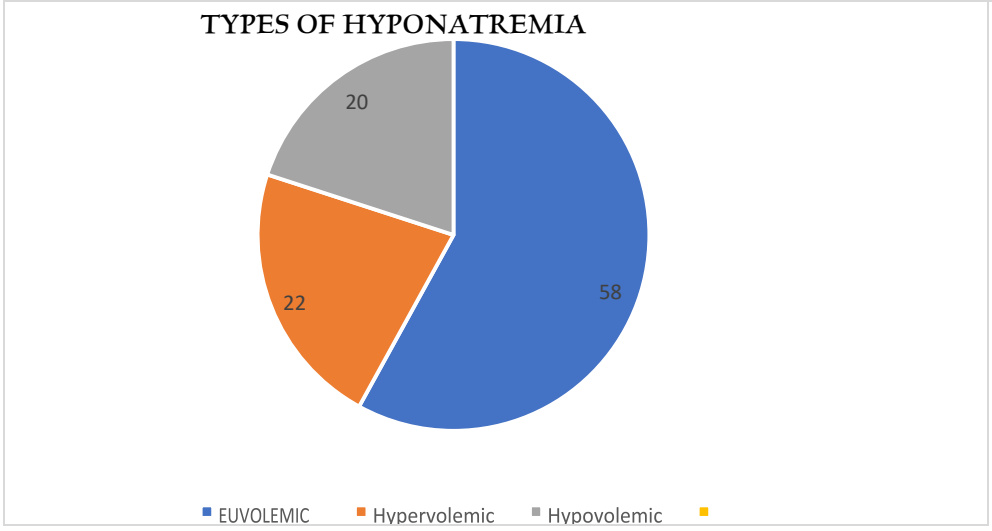


5. DISTRIBUTION OF PATIENT ACCORDING TO TYPES OF HYPONATREMIAS

SR NO.	TYPES OF HYPONATREMIAS	PERCENTAGE [%]
1.	Euvolemic	58
2.	Hypervolemic	22
3.	Hypovolemic	20



6. DISTRIBUTION OF THE PATIENTS ACCORDING TO COMORBIDITIES

SR NO.	COMORBIDITIES	PERCENTAGE [%]
1.	Hypertension	60
2.	Diabetes mellitus	45
3.	Congestive cardiac failure	25
4.	Renal failure	18
5.	Chronic liver disease	05
6.	Hypothyroidism	02

COMORBIDITIES

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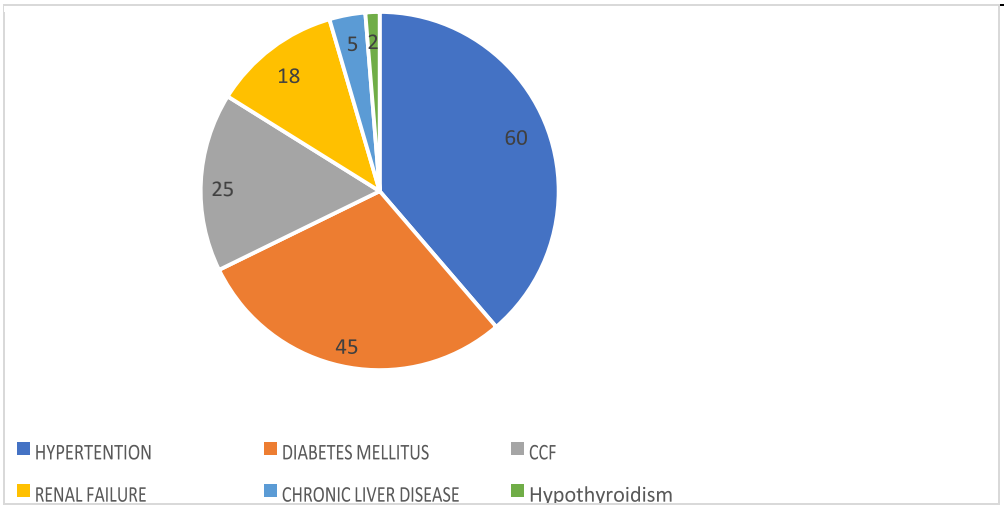
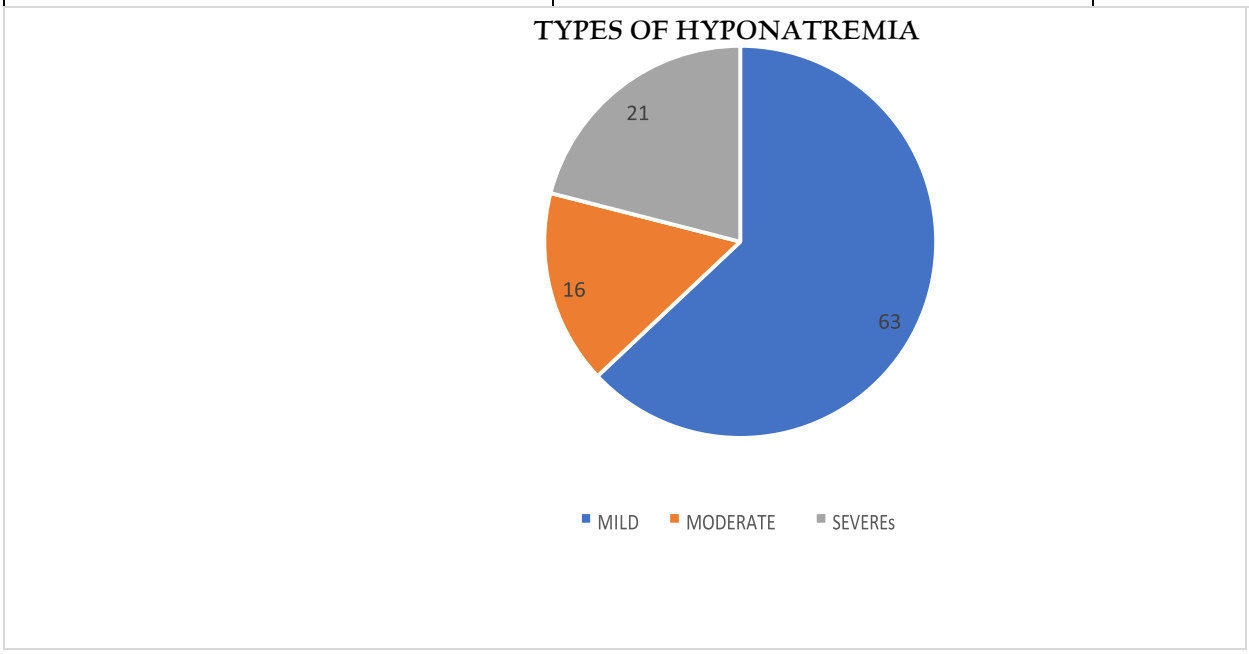


7. DISTRIBUTION OF PATIENT ACCORDING TO SEVERITY OF HYPONATREMIA

SEVERITY OF HYPONATREMIA	SERUM SODIUM RANGE [mEq/L]	PERCENTAGE [%]
MILD	130-135	63
MODERATE	125-129	16
SEVERE	<125	21



8. ASSOCIATION OF TYPES OF HYPONATREMIAS AND OUTCOME

TYPES OF HYPONATREMIA	IMPROVED	DIED	TOTAL

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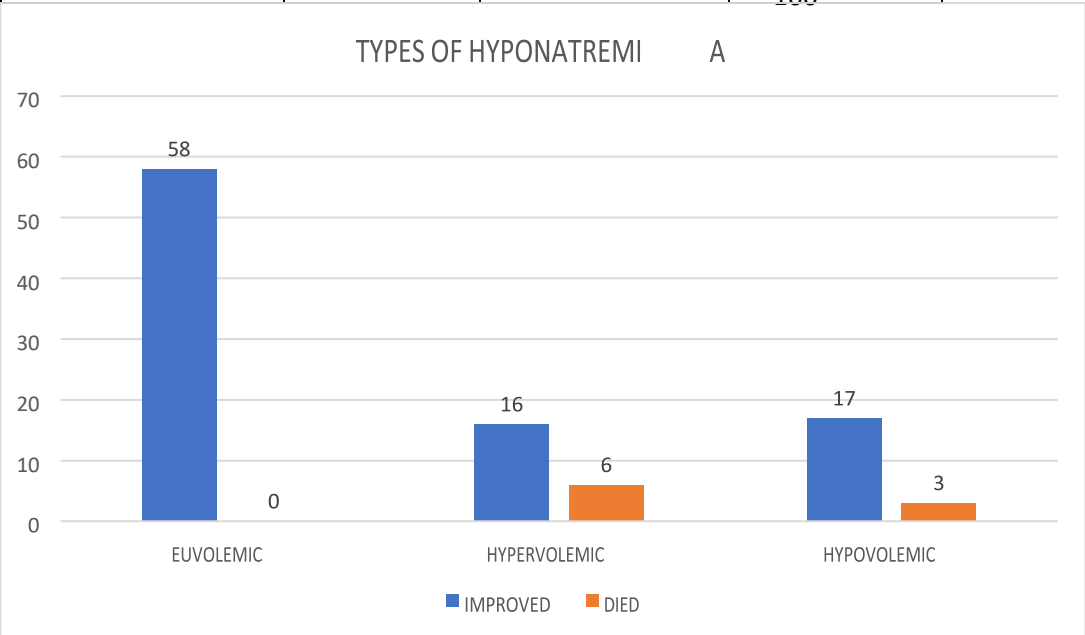
Euvolemic	58	0	58
Hypervolemic	16	6	22
Hypovolemic	17	3	20
			100



DISCUSSION

Hyponatremia is the most common electrolyte disorder in critically ill patients. Hyponatremia is important to recognize because of the potential morbidity, mortality. It is associated with considerably morbidity and mortality in many chronic diseases most notably in patient with congestive heart failure [5] and cirrhosis of liver.[6] In our study 60 percentage of patient were elderly. Incidence of hyponatremia has direct correlation with age[7] as multiple comorbidities increase with age, treatment, of which predispose a patient to hyponatremia. Like our study Bennani et al.in a study on hyponatremia in ICU found that euvolemic hyponatremia was the most common type of hyponatremia.[8] In our study, SIADH is most common cause of hyponatremia. In a study by Berghmans et al. also found that SIADH is the most common cause of hyponatremia.[9] Coussement et al. was found to be as a common and potentially lethal complication in critically ill patient.[10] In our study, sepsis is the second most common aetiology for hyponatremia. Hannon and Boston observed that hyponatremia associated with sepsis is known to have an increased morbidity and mortality. The cause of this phenomenon is unknown, but may be related to dilution of the extracellular space with retained exogeneous fluid.[11] A majority of our patient had mild to moderate hyponatremia. Thomas et al4 in 2006 have reported that a majority of their patient had mild to moderate hyponatremia. Jalan et al8 in 2003 from Singapore have reported increasing age is a strong independent risk factor for hyponatremia. Drowsiness was the commonest symptoms in our study. Patients with severe degree of hyponatremia were more likely to be symptomatic. Seizures were seen in severe hyponatremia. Similar findings were seen in other studies.[12,13] In our study, cause of hyponatremia in CCF is salt and water retention and patient on diuretics. Thomas Abraham et al have also reported that cause of hyponatremia in CCF are salt and water retention, diuretics therapy and low salt diet, which also correlated well with other studies also.[14,15,16,17] The main treatment of euvolemic hyponatremia was isotonic saline. The most common treatment given for hypovolemic hyponatremia was also isotonic saline. Treatment of hyponatremia with hypertonic saline should be restricted to the patients with severe hyponatremia and those with neurological symptoms of hyponatremia. Treatment with hypertonic saline is safe provided gradual correction of hyponatremia is followed. Osmotic demyelination syndrome is a rare complication related to the treatment of hyponatremia and should be suspected in a case of hyponatremia who develops fresh neurological deficits while on treatment or after treatment with hypertonic saline. Severe hyponatremia is associated with considerable mortality with underlying medical disease as advanced cirrhosis.

CONCLUSION

Hyponatremia is a frequent finding in the critically ill, most of these patients are euvolemic. SIADH is the most common cause of hyponatremia in critically ill patient. Most common symptoms of hyponatremia is drowsiness. Elderly male are most commonly affected. 60% of patient had hypertension and 45% of patient had diabetes as co morbid condition. Most

patient were of mild and moderate hyponatremia. Euvolemic hyponatremia is most common type of hyponatremia. Mortality rate was 9% in our study.

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Conflicts of Interest: None
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