



## A STUDY OF CLINICAL PROFILE OF HYPONATRAEMIA: A PHYSIOLOGISTS VIEW

### Physiology

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### ABSTRACT

Hyponatraemia is an acute or chronic state of clinical emergency when the blood serum level of sodium falls less than 135 mmol/L. The different states can be either hypervolemia, euvoolemia or hypovolemia. This state if not treated immediately can be fatal. This study puts in an effort to study the clinical and management profile of hyponatraemia cases.

### KEYWORDS

Physiology, Clinical, Management Profile, Hyponatraemia

### INTRODUCTION:

Serum sodium is the major determinant of serum osmolality and therefore extracellular fluid volume. Urinary sodium excretion is dependent on the GFR and therefore is low in neonates when compared with adults. Normal neonatal serum sodium levels are 135 to 140 mmol/L, controlled by moderating renal excretion. During the period of oliguria on the first day of life, sodium supplementation is not normally required. The normal maintenance sodium requirement after normal diuresis is 2 to 4 mmol/kg/day. Hyponatremia is defined when serum sodium concentrations are less than 135 mmol/L. Treatment depends on the fluid status of the patient and in case of hypovolemia or hypervolemia, fluid status should be corrected first. When normovolemic, serum sodium levels should be gradually corrected with NaCl infusion, but at a rate not exceeding 0.8 mEq/kg/hr. Symptoms are not reliable for clinical management because they are not often apparent until serum sodium levels fall to less than 120 mmol/L, and their severity is directly related to the rapidity of onset and magnitude of hyponatremia. If not promptly recognized, hyponatremia may manifest as the effects of cerebral edema: apathy, nausea, vomiting, headache, fits, and coma. Urine sodium concentrations can be useful to help determine the underlying cause of hyponatremia because the kidneys respond to a fall in serum sodium levels by excreting more dilute urine, but the secretion of antidiuretic hormone (ADH)/vasopressin in response to hypovolemia affects this. Urine sodium concentrations less than 10 mmol/L indicates an appropriate renal response to euvolemic hyponatremia. However if the urinary sodium concentration is greater than 20 mmol/L this can indicate either sodium leakage from damaged renal tubules or hypervolemia. Hyponatremia (serum sodium concentrations >145 mmol/L) may be due to hemoconcentration/excessive fluid losses (e.g., diarrhea). Symptoms and clinical signs include dry mucous membranes, loss of skin turgidity, drowsiness, irritability, hypertonicity, fits, and coma. Treatment is again by correction of fluid status with appropriate electrolyte-containing solutions. Other causes of hypernatremia are renal or respiratory insufficiency, or it can be related to drug administration.

**Total Body Sodium Content Versus Plasma Sodium Concentration**  
Plasma sodium concentration is different than, and independent of, total body sodium content. Total body sodium content refers to the total number of sodium molecules in the body, regardless of the ratio of sodium to water. Sodium content determines the hydration status of the animal. As it is used clinically, hydration is a misnomer, because findings such as skin tenting and moistness of the mucous membranes and conjunctival sac are determined by both the sodium content and the water that those sodium molecules hold in an animal's interstitial space.

When patients have increased total body sodium, an increased quantity of fluid is held within the interstitial space and the animal appears overhydrated, regardless of the plasma sodium concentration. Overhydrated patients may manifest a gelatinous subcutis; peripheral or ventral pitting edema; chemosis; or excessive serous nasal discharge.

When patients have decreased total body sodium, a decreased quantity of fluid is held within the interstitial space and the animal appears dehydrated, regardless of the plasma sodium concentration. Once a patient has lost 5% or more of its body weight in isotonic fluid ( $\geq 5\%$  "dehydrated"), it may manifest decreased skin turgor, tacky or dry

mucous membranes, decreased fluid in the conjunctival sac, or sunken eye position. Patients that are less than 5% dehydrated appear clinically normal. Patients with dehydration can become hypovolemic as fluid shifts from the intravascular space into the interstitial space as a result of decreased interstitial hydrostatic pressure.

The sodium/water ratio is independent of the total body sodium content: Patients may be normally hydrated, dehydrated, or overhydrated (normal, decreased, or increased total body sodium content) and have a normal plasma sodium concentration, hypernatremia, or hyponatremia.

### Aims and Objectives:

To study the clinical and management profile of hyponatraemia cases.

### MATERIALS AND METHODS:

**Study design:** A retrospective study.

**Study period:** February 2017 – August 2018.

**Study setting:** Department of Physiology with the kind help of Department of Medicine, Karwar Institute of Medical Sciences, Karwar.

**Study population:** All patients presented to our centre

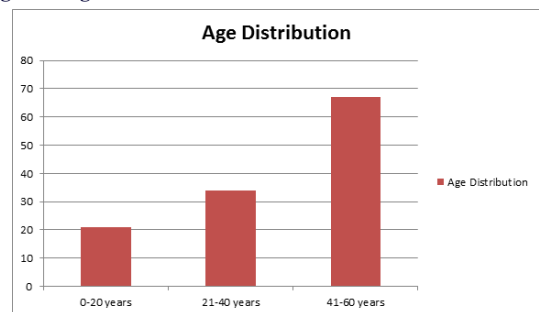
**Sample size:** 123 patients

**Study group:** Patients clinically and laboratory diagnosed with Hyponatremia.

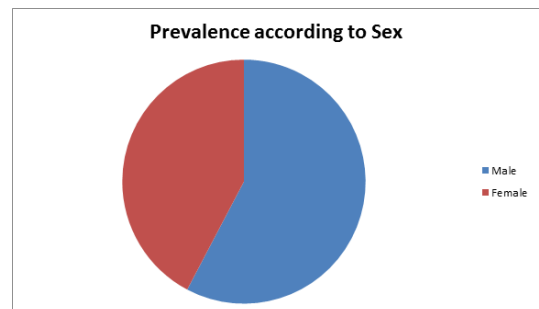
### RESULTS:

#### Table 1: Sex Distribution

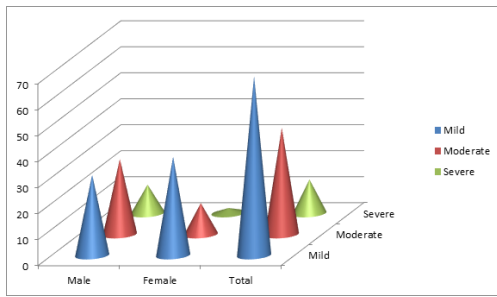
#### Figure 1: Age Distribution



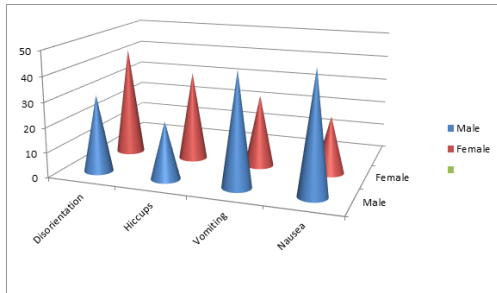
#### Figure 2: Male and Female Prevalence



**Figure 3: Severity**



**Table 1: Clinical Symptoms**



**DISCUSSION:**

A serum level of less than 135mmol/lit is defined as hyponatraemia. It can be due to be either hypervolemia, euvolemia or hypovolemia condition<sup>1,2,3</sup>. It has a high prevalence especially with patients with metabolic disorders<sup>4,5</sup>. Diabetes is one such condition. Over correction of dehydration is the leading cause of the illness. Acute is a state where the whole scenario arises and manifests within 48 hours. Hyponatremia causes neurological deficits and the patients come with a plethora of symptoms. Pinpoint diagnosis is the need of the hour as any delay in identifying can actually cause fatal irreversible brain damage to the patients<sup>6,7,8</sup>. The correction also if identified has to be done in a graded manner, if not may again be fatal by causing osmotic demyelination<sup>8</sup>.

The grading of the hyponatremia is as follows. Mild is defined as serum level in the range of 125 Eq/lit to 134 mEq/lit. Moderate Hyponatraemia is defined as serum levels between 125 mEq/L - 129 mEq/L, and Severe Hyponatraemia is defined as less than 124 mEq/lit. The treatment should never be corrected more than 25mEq/lit over 24 hours<sup>9,10</sup>.

In our study majority of the patients who came belonged to the age group 40-60 years. This perhaps reflects on the fact that younger generation suffers less as they have systems working to the full capacity to correct the alterations. In our study majority of the patients were males. Four fifths were alcoholics and were also known to have different metabolic disorders. The severity was more seen in males. They had it because majority of them had other metabolic disorders and also many of them were alcoholics. Disorientation which followed closely vomiting and nausea were the commonest complaints. And males and females had similar symptoms and definitely they followed a pattern. Over 90 percent of them had acute onset of the disease. Only ten percent had chronic onset. Treatment was similar to both the groups. Saline, iv fluids and also fluid restriction was followed. The duration of the stay in chronic patients was more when compared to the other group. The complications were also of the same magnitude. Immediate and Prompt treatment is necessary for the condition.

**CONCLUSION:**

Immediate and Prompt treatment is necessary for the condition and reduces the fatality by enormous times.

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