SAS Journal of Medicine
Abbreviated Key Title: SAS J Med
ISSN 2454-5112
Journal homepage: https://saspublishers.com

OPEN ACCESS

Medicine

Clinical Patterns and Severity Distribution of Hyponatremia in Elderly Patients

Dr. Md. Khorshed Minhajul Alam Mondol[1*], Prof. Dr. Md. Daharul Islam[2], Dr. Md. Nazim Uddin[3], Dr. S. M Mahmud Hasan[4], Dr. Md Shariful Alam[5], Dr. S.M Nazmul Haque[6], Dr. Md. Nurul Islam[7], Dr. Shahin Reza[8]

[1]Assistant Professor (Insitu), Department of Medicine, Sir Salimullah Medical College Mitford Hospital, Dhaka, Bangladesh
[2]Professor, Department of Medicine, Sir Salimullah Medical College Mitford Hospital, Dhaka, Bangladesh
[3]Assistant Professor (Insitu), Department of Medicine, Upazila Health Complex, Daulatpur Kushtia, Bangladesh
[4]Assistant Professor (Insitu), Department of Nephrology, Rajshahi Medical College Hospital, Rajshahi, Bangladesh
[5]Assistant Professor, Department of Medicine, Ashiyan Medical College, Khilkhet, Dhaka, Dhaka.
[6]Assistant Professor (Insitu), Department of Medicine, Sir Salimullah Medical College Mitford Hospital, Dhaka, Bangladesh
[7]Assistant Professor (Insitu), Department of Medicine, Rangpur Medical College & Hospital, Rangpur, Bangladesh
[8]Junior Consultant (Insitu), Department of Surgery, Sir Salimullah Medical College Mitford Hospital, Dhaka, Bangladesh

DOI: https://doi.org/10.36347/sasjm.2026.v12i01.009 | **Received:** 18.11.2025 | **Accepted:** 21.01.2026 | **Published:** 27.01.2026

***Corresponding author:** Dr. Md. Khorshed Minhajul Alam Mondol
Assistant Professor (Insitu), Department of Medicine, Sir Salimullah Medical College Mitford Hospital, Dhaka, Bangladesh

Abstract **Original Research Article**

Background: Hyponatremia is one of the most common electrolyte disorders among elderly hospitalized patients and is associated with a wide spectrum of clinical manifestations and adverse outcomes. Age-related physiological changes, comorbid conditions and polypharmacy contribute to its increased prevalence and variable presentation. This study aimed to evaluate the clinical patterns, severity distribution and volume status of hyponatremia among elderly patients admitted to a tertiary care hospital. ***Methods:*** This hospital-based observational study included 66 patients aged 60 years and above with documented hyponatremia admitted to the medical wards of a tertiary hospital in Bangladesh. Patients were classified into mild, moderate and severe hyponatremia based on serum sodium concentrations. Clinical presentations and volume status were systematically recorded and associations between symptom patterns and severity were analyzed using appropriate statistical tests. ***Results:*** Mild hyponatremia was the most prevalent form (59.1%), followed by moderate (27.3%) and severe (13.6%) hyponatremia. Hypervolemic hyponatremia was the most common volume status (40.9%), followed by euvolemic and hypovolemic types. Gastrointestinal symptoms predominated, with vomiting (63.6%) and nausea (48.5%) being most frequent. Vomiting, loss of appetite, fever, diarrhea and abdominal pain were significantly more common in moderate to severe hyponatremia ($p<0.05$), whereas neurological manifestations were comparatively infrequent. ***Conclusion:*** Hyponatremia in elderly patients commonly presents with mild biochemical abnormalities and nonspecific gastrointestinal symptoms. Recognition of symptom severity and volume status is essential for early diagnosis, appropriate classification and effective management.

Keywords: Hyponatremia, elderly, clinical presentation, severity.

INTRODUCTION

Hyponatremia is the most frequently encountered electrolyte disorder among hospitalized patients and occurs disproportionately in the elderly population. Age-related physiological changes, including reduced renal concentrating ability, impaired free water excretion and altered thirst perception, predispose older adults to disturbances in sodium homeostasis. [1,2] These intrinsic factors are often compounded by the high prevalence of comorbid illnesses and increased exposure to medications that influence water and sodium balance.

Even mild reductions in serum sodium concentration are now recognized as clinically relevant in elderly individuals. Previous studies have demonstrated that mild hyponatremia is associated with adverse outcomes such as cognitive impairment, gait disturbances, increased risk of falls, longer hospital stays and higher mortality rates. [3,4] These findings challenge earlier assumptions that mild hyponatremia is a benign biochemical abnormality, particularly in older patients.

The burden of hyponatremia among elderly hospitalized patients is substantial, with reported prevalence rates varying widely across settings. Observational studies from tertiary care hospitals have documented prevalence estimates ranging from approximately 7% to over 30%, depending on study population characteristics and diagnostic thresholds. [5,6] This variability reflects differences in underlying disease burden, healthcare practices and patient demographics, but consistently highlights hyponatremia as a common clinical problem in geriatric medicine.

Several risk factors contribute to the high incidence of hyponatremia in elderly patients. Polypharmacy, especially the use of diuretics and medications that enhance antidiuretic hormone activity, plays a significant role. [7,8] In addition, chronic conditions such as heart failure, renal dysfunction and systemic infections further increase susceptibility to sodium imbalance [11]. These factors frequently coexist in elderly patients, resulting in complex and multifactorial pathophysiology.

The clinical presentation of hyponatremia in older adults is often nonspecific and may overlap with symptoms of aging or comorbid disease, leading to under recognition and delayed diagnosis. Manifestations can range from gastrointestinal symptoms such as nausea and vomiting to neurological features including confusion, seizures and altered consciousness [12]. Importantly, symptom severity does not always correlate directly with serum sodium concentration, complicating clinical assessment.

Despite extensive literature on hyponatremia, data examining the relationship between clinical presentation, severity categories and volume status in elderly patients from Bangladesh remain limited. Understanding these patterns is essential for early recognition and appropriate classification. Therefore, this study aimed to describe the clinical presentation, severity distribution and volume status of hyponatremia among elderly patients admitted to a tertiary care hospital in Bangladesh.

METHODOLOGY & MATERIALS

This hospital-based observational study was conducted in the Department of Internal Medicine at Sir Salimullah Medical College and Mitford Hospital, Dhaka, Bangladesh, over a period of twelve months. The study population comprised elderly patients aged 65 years and above who were admitted to the medical wards during the study period and were found to have hyponatremia, defined as a serum sodium concentration below 135 mmol/L. A total of 66 patients were enrolled consecutively after fulfilling the inclusion criteria.

Inclusion criteria

- Age ≥65 years
- Hospitalized patients of either sex
- Serum sodium concentration <135 mmol/L

Exclusion criteria

- Patients with pseudohyponatremia due to paraproteinemia or hyperlipidemia
- Patients receiving mannitol therapy
- Critically ill patients requiring intensive care support

After obtaining informed written consent, detailed clinical histories were recorded using a structured case record form. Information regarding presenting symptoms such as nausea, vomiting, generalized weakness, altered sensorium, seizures, diarrhea and abdominal pain was systematically documented. Comprehensive physical examinations were performed to assess hydration status and identify features suggestive of hypovolemia, euvolemia, or hypervolemia. Venous blood samples were collected under aseptic conditions and serum sodium levels were measured using standard ion-selective electrode techniques available in the hospital laboratory. Based on serum sodium concentration at presentation, patients were categorized into mild (130–135 mmol/L), moderate (125–129 mmol/L) and severe (<125 mmol/L) hyponatremia in accordance with established clinical definitions. Volume status was determined clinically and categorized as hypovolemic, euvolemic, or hypervolemic. Ethical approval for the study was obtained from the Ethical Review Committee of Sir Salimullah Medical College. Patient confidentiality was maintained throughout the study by anonymizing data and restricting access to study records. Data were entered and analyzed using SPSS version 22.0 for Windows. Categorical variables were expressed as frequencies and percentages. Associations between the severity of hyponatremia and clinical manifestations were evaluated using the Chi-square test or Fisher's exact test, where appropriate. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1: Age Distribution of Study Population (n=66)

Age group (years)	Frequency (n)	Percentage (%)
60–65	28	42.4
66–70	15	22.7
>70	23	34.8
Total	66	100

The majority (42.4%) of the patients were aged between 65 and 70 years, followed by 22.7% who were aged between 71 and 75 years and 34.8% who were above 75 years.

Table 2: Distribution of the Patients by Severity of Hyponatremia (n=66)

Severity of Hyponatremia	Frequency (n)	Percentage (%)
Mild (130-135 mmol/L)	39	59.1
Moderate (125-129 mmol/L)	18	27.3
Severe <125 mmol/L	9	13.6
Total	66	100

Mild hyponatremia was found in 59.1% cases, followed by 27.3% had moderate and 13.6% had severe hyponatremia.

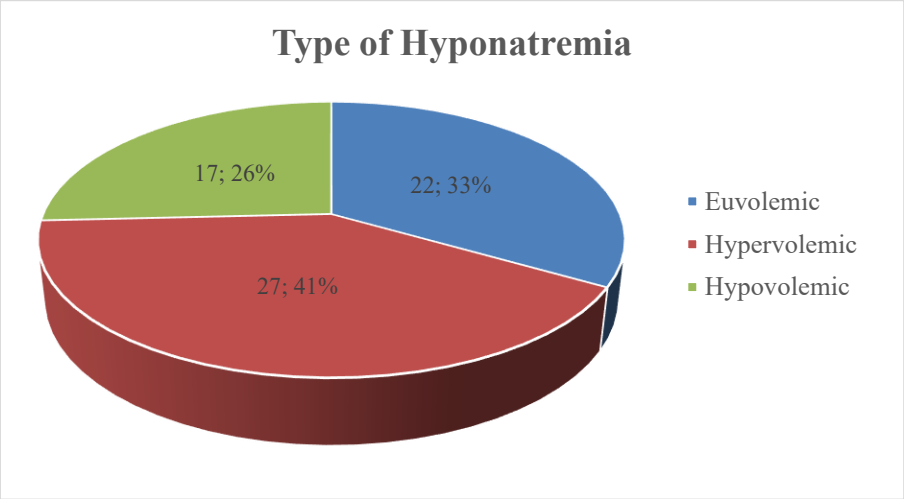

Figure 1: Distribution of the Patients by Type of Hyponatremia (n=66)

Euvolemia was found in 33.3% cases, followed by 40.9% had Hypervolemia and 25.8% had Hypovolemia.

Table 3: Clinical Presentation with the Severity of Hyponatremia (n=66)

Clinical presentation	Mild (n=39)	Moderate (n=18)	Severe (n=9)	Total	P value
	n (%)	n (%)	n (%)	n (%)	
Vomiting	24 (61.5)	9 (50)	9 (100)	42 (63.6)	0.036
Nausea	17 (43.6)	9 (50)	6 (66.7)	32 (48.5)	0.453
Loss of appetite	6 (15.4)	10 (55.5)	5 (55.5)	21 (31.8)	0.003
Drowsiness	10 (25.6)	6 (33.3)	3 (33.3)	19 (28.8)	0.738
Fever	6 (15.4)	9 (50)	3 (33.3)	18 (27.3)	0.019
Diarrhea	3 (7.7)	9 (50)	3 (33.3)	15 (22.7)	0.001
Abdominal pain	3 (7.7)	6 (33.3)	6 (66.7)	15 (22.7)	0.001
Bilateral leg swelling	4 (10.2)	3 (16.7)	2 (22.2)	9 (13.6)	0.539
Seizure	4 (10.2)	0 (0)	0 (0)	4 (6.1)	0.448
Jaundice	3 (7.7)	0 (0)	0 (0)	3 (4.5)	0.709

Most common clinical presentation was vomiting (63.6%) and nausea (48.5%) followed by loss of appetite (31.8%), drowsiness (28.8%), fever (27.3%), diarrhea (22.7%), abdominal pain (22.7%), bilateral leg swelling (13.6%), seizure (6.1%) and jaundice (4.5%). Vomiting, loss of appetite, fever, diarrhea and abdominal pain were significantly higher in moderate to severe hyponatremia than mild hyponatremia.

DISCUSSION

The present study provides valuable insight into the clinical patterns and severity distribution of hyponatremia among elderly patients admitted to a tertiary care hospital in Bangladesh. The findings demonstrate that hyponatremia in older adults is predominantly mild in severity, frequently accompanied by gastrointestinal and systemic manifestations and commonly associated with hypervolemic and euvolemic states. These observations are consistent with existing literature emphasizing the multifactorial etiology and heterogeneous presentation of hyponatremia in elderly populations.

The age distribution in this study revealed that most patients were between 60 and 65 years, with a substantial proportion above 70 years, reflecting the

growing vulnerability of ageing individuals to electrolyte disturbances. Similar demographic patterns have been reported in hospital-based studies from South Asia, where hyponatremia is frequently observed in the early elderly period due to cumulative exposure to comorbidities, polypharmacy and age-related physiological changes. [11,12] Declining renal concentrating capacity, impaired free water excretion and altered thirst regulation have been identified as key contributors to sodium imbalance in older adults, even in the absence of overt systemic illness.[2]

Mild hyponatremia constituted nearly three-fifths of cases in the present cohort, a finding that aligns with observations by Baruah *et al.,* and Dash *et al.,* who similarly reported a predominance of mild biochemical abnormalities among elderly inpatients. [13,14] The frequent detection of mild hyponatremia may reflect routine electrolyte monitoring in hospitalized patients; however, growing evidence suggests that even modest reductions in serum sodium are clinically significant in older adults. Studies by Boyer *et al.,* and Brink Koetter *et al.,* have demonstrated associations between mild hyponatremia and adverse outcomes such as falls, gait instability and cognitive impairment, underscoring its clinical relevance. [3,15]

Analysis of volume status revealed hypervolemic hyponatremia as the most prevalent subtype, followed by euvolemic and hypovolemic forms. This distribution mirrors findings from previous studies in similar inpatient settings, where heart failure, chronic liver disease and renal dysfunction are common underlying conditions contributing to water retention and dilutional hyponatremia. [16] The notable proportion of euvolemic hyponatremia is also consistent with literature highlighting the high prevalence of syndrome of inappropriate antidiuretic hormone secretion among hospitalized elderly patients, often precipitated by infections, medications, or pulmonary pathology.[17]

The clinical presentation of hyponatremia in this study was dominated by gastrointestinal symptoms, particularly vomiting and nausea, followed by loss of appetite and drowsiness. Vomiting was significantly more frequent in patients with severe hyponatremia, a finding that corroborates reports by Maqbool *et al.,* and Jain *et al.,* who identified gastrointestinal manifestations as common early indicators of worsening sodium imbalance. [18,19] The significant association of loss of appetite, fever, diarrhea and abdominal pain with moderate to severe hyponatremia suggests that systemic illness, inflammation and fluid losses may exacerbate sodium derangements in elderly patients, compounding their vulnerability.

Neurological manifestations such as seizures were relatively uncommon in this cohort and did not demonstrate a statistically significant association with severity. While severe neurological symptoms are classically associated with profound hyponatremia, prior studies have highlighted variability in neurological presentation among elderly patients, influenced by chronicity of sodium imbalance and cerebral adaptive mechanisms.[1,10] Filippatos *et al.,* noted that gradual declines in serum sodium allow for cerebral osmotic adaptation, potentially masking overt neurological signs despite significant biochemical abnormalities.[1] This phenomenon complicates clinical assessment and reinforces the limitation of relying solely on symptom severity to estimate biochemical derangement.

Collectively, the findings of this study reinforce the importance of maintaining a high index of suspicion for hyponatremia in elderly inpatients presenting with nonspecific gastrointestinal or systemic symptoms. The observed associations between symptom patterns and severity highlight the need for routine electrolyte evaluation, early classification and appropriate volume assessment to guide management. Given the aging population and rising hospital admissions among older adults, such region-specific data are essential to improve clinical recognition and optimize outcomes in this vulnerable group.

Limitations and recommendations

The single-center design and limited sample size may restrict generalizability. Larger multicenter studies incorporating etiological assessment and outcome analysis are recommended to better inform management strategies for hyponatremia in elderly populations.

CONCLUSION

Hyponatremia among elderly patients was predominantly mild in severity and commonly associated with gastrointestinal and systemic symptoms. Hypervolemic and euvolemic forms were most frequent and symptom burden increased with worsening severity. Early recognition of clinical patterns may facilitate timely diagnosis and management, potentially reducing morbidity in this vulnerable population.

Conflicts of interest: There are no conflicts of interest.

Ethical Approval: Study approved the institutional review committee.

REFERENCES

1. Filippatos TD, Makri A, Elisaf MS, Liamis G. Hyponatremia in the elderly: challenges and solutions. Clinical interventions in aging. 2017 Nov 14:1957-65.
2. Rosner MH. Hyponatremia in the elderly: etiologies, implications and therapy. Aging Health. 2011 Oct 1;7(5):775-85.
3. Boyer S, Gayot C, Bimou C, Mergans T, Kajeu P, Castelli M, Dantoine T, Tchalla A. Prevalence of mild hyponatremia and its association with falls in older adults admitted to an emergency geriatric

medicine unit (the MUPA unit). BMC geriatrics. 2019 Oct 15;19(1):265.
4. Cumming K, McKenzie S, Hoyle GE, Hutchison JD, Soiza RL. Prognosis of hyponatremia in elderly patients with fragility fractures. Journal of clinical medicine research. 2014 Oct 16;7(1):45.
5. Ganguli A, Mascarenhas RC, Jamshed N, Tefera E, Veis JH. Hyponatremia: incidence, risk factors and consequences in the elderly in a home-based primary care program. Clinical nephrology. 2015 Jun 3;84(2):75.
6. Zhang X, Li XY. Prevalence of hyponatremia among older inpatients in a general hospital. European geriatric medicine. 2020 Aug;11(4):685-92.
7. Auriemma L, Quarto GV, Fracalossi GA, Buzatto BC, Felix TP, Tieppo A, Morelato RL. Hyponatremia in hospitalized older adults is associated with polypharmacy; longer hospital stays and higher mortality. Geriatrics, Gerontology and Aging. 2018;12(4):202-5.
8. Ellison DH. Clinical pharmacology in diuretic use. Clinical Journal of the American Society of Nephrology. 2019 Aug 1;14(8):1248-57.
9. Woodward M, Gonski P, Grossmann M, Obeid J, Scholes R, Topliss DJ. Diagnosis and management of hyponatraemia in the older patient. Internal medicine journal. 2018 Jan; 48:5-12.
10. Sahay M, Sahay R. Hyponatremia: A practical approach. Indian journal of endocrinology and metabolism. 2014 Nov 1;18(6):760-71.
11. Chandregowda MK, Unnikrishnan A. Study of clinical profile of hyponatremia in elderly patients admitted to medical wards at Mandya institute of medical sciences, Mandya. Int Surg J. 2021; 8:390-4.
12. Rajamani, S., Binu, D., Pushpangadan, V. & Shankar, D.R., 2017. Clinico-etiological profile of Hyponatremia in elderly. International Journal of Medical and Health Research, 3(7), 2454–9142.
13. Baruah C, Kutum N, Dutta D, Deb B. A Hospital Based Observational Study on Clinical Profile of Hyponatremia in Elderly.
14. DASH SC, SUNDARAY NK, RAJESH B, PAGAD T. Hyponatremia in Elderly In-Patients. Journal of Clinical & Diagnostic Research. 2019 Feb 1;13(2).
15. Brinkkoetter PT, Grundmann F, Ghassabeh PJ, Becker I, Johnsen M, Suaréz V, Schulz RJ, Streichert T, Burst V. Impact of resolution of hyponatremia on neurocognitive and motor performance in geriatric patients. Scientific reports. 2019 Aug 29;9(1):12526.
16. Ponikowski P, Voors AA, Anker SD, Bueno H, Cleland JG, Coats AJ, Falk V, González-Juanatey JR, Harjola VP, Jankowska EA, Jessup M. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. Polish Heart Journal (Kardiologia Polska). 2016;74(10):1037-147.
17. Yasir M, Mechanic OJ. Syndrome of inappropriate antidiuretic hormone secretion. InStatPearls [internet] 2023 Mar 6. StatPearls Publishing.
18. Maqbool M, Raina AA, Mir BA, Rafi A, Shah PA. Journal Homepage: -www. journalijar. com.
19. Jain AK, Nandy P. Clinico-etiological profile of hyponatremia among elderly age group patients in a tertiary care hospital in Sikkim. Journal of Family Medicine and Primary Care. 2019 Mar 1;8(3):988-94.