DETAILED FINDINGS ABOUT THE ASSESSMENT AND MANAGEMENT OF HYPERNATRAEMIA

Timely identification of poor oral intake may allow interventions to prevent the development and/or worsening of hypernatraemia.[4] The most common cause of hypernatraemia was poor oral intake (77/142 (54.2%) (T6.1). Notably, there were no patients in our study who had undergone pituitary surgery, which can be associated with acute onset arginine vasopressin deficiency (diabetes insipidus) and subsequent hypernatraemia.

Table 6.1 Diagnoses associated with the hypernatraemia	Number of patients	%
Poor oral intake	77	54.2
Dementia/cognitive impairment	44	31.0
Acute kidney injury	43	30.3
Recent diarrhoea and/or vomiting	18	12.7
Hyperglycaemic hyperosmolar state	17	12.0
Mental health diagnosis	13	9.2
Significant brain injury	11	7.7
Other (specified)	6	4.2
Previous diagnosis of vasopressin related polyuria - diabetes insipidus	4	2.8
None documented	19	13.4

Clinician questionnaire data. Answers may be multiple; n=142

In addition to fluid balance, it is essential that regular assessment of fluid status is undertaken to determine if the patient is becoming dehydrated. This would enable steps, such as increased fluid intake or stopping medicines that may worsen dehydration, to prevent hypernatraemia developing.

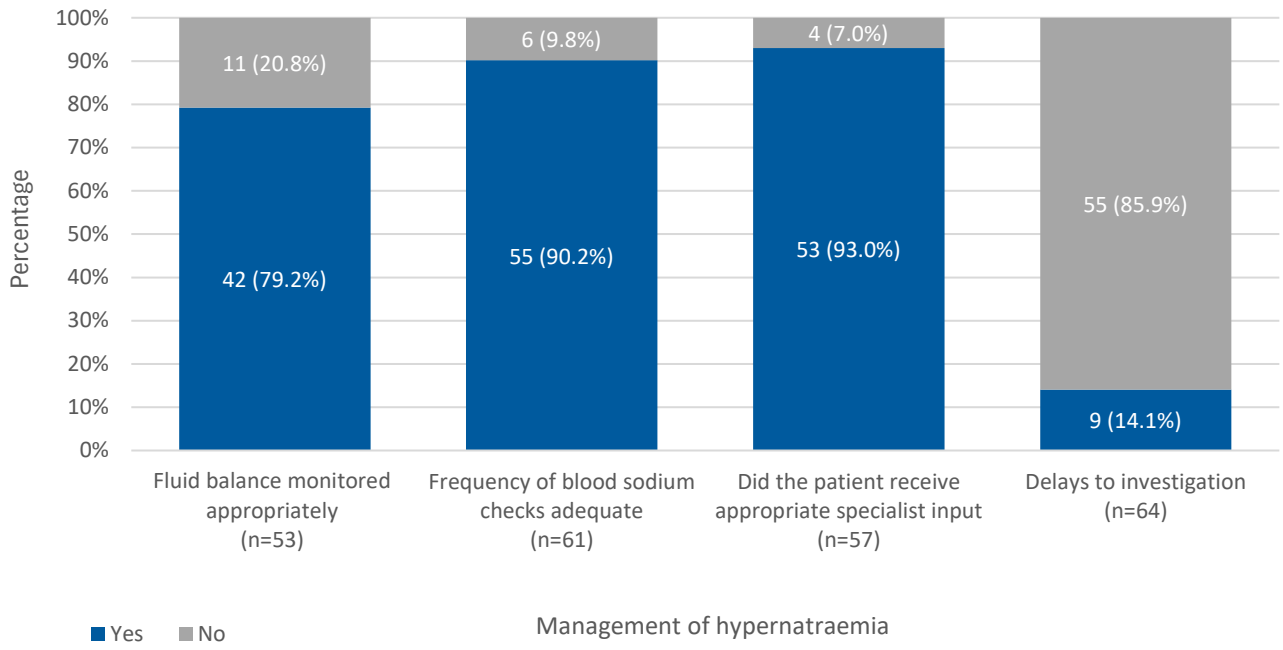

Figure 6.1 Frequency of appropriateness of key stages of management of hypernatraemia

Reviewer assessment form data

There were 11/53 (unknown in 12) patients with hypernatraemia where appropriate monitoring of fluid balance was not undertaken which if improved could have detected ongoing poor oral intake (F6.1). In addition to monitoring fluid balance, it is essential that patients who have or are at risk of hypernatraemia have regular assessment of their fluid status to determine if they are becoming dehydrated. This would enable steps, such as increased oral or intravenous fluid intake or stopping medicines that may worsen dehydration, to prevent hypernatraemia developing or worsening.

Even though appropriate monitoring of blood sodium levels was undertaken in 55/61 (unknown in 4) patients, there were delays in investigations in 55/64 (unknown in 1) (F6.1). Only 39/52 patients had both an appropriate fluid balance and sodium monitoring undertaken. If both documentation of fluid balance and sodium monitoring were improved, this could detect those patients at risk of developing or worsening hypernatraemia, allowing for earlier intervention and prevention.

Although this study focused on the care provided following admission to hospital, given the high proportion of patients with hypernatraemia admitted from a supported living environment (residential or care home) (T2.2) education on monitoring fluid intake in these settings could enable interventions to be delivered outside of hospital, potentially preventing hospital admissions due to hypernatraemia.

In total, 4/142 (2.8%) patients admitted with hypernatraemia had a previous diagnosis of arginine vasopressin disorder (diabetes insipidus). Not all were taking desmopressin, yet it is essential that patients take desmopressin on a regular basis, otherwise there is the risk that they will develop hypernatraemia due to an inability to maintain sufficient fluid intake.

Occasionally patients treated with desmopressin are advised to omit one dose of desmopressin a week to prevent over-treatment; this is on an individual patient basis and the day it is omitted can be varied to prevent the patient being inconvenienced by the increased urine output and associated thirst. This may be more difficult to do in a patient who does not have a sensation of thirst, due to brain injury (surgical or trauma related) or has a neurocognitive impairment where they do not remember to drink. Where patients do omit doses, they will be given advice by their endocrine team on what to do if they are passing large amounts of urine, have excessive thirst or there is an increase in ambient air temperature (for example during a heatwave).

The majority of hypernatraemia treatment involved rehydration (intravenous: 105 patients; oral/nasogastric rehydration: nine patients and combined oral/intravenous treatment: seven patients) (T6.2). In a small proportion (10: 7.0%) of patients there was no active treatment provided; the highest sodium values in these patients were 146–150 mmol/L: four patients; 151–155 mmol/L: three patients; 156–160 mmol/L: two patients; greater than 160 mmol/L: one patient and seven patients who had no active treatment died. For most patients, the treatment(s) administered were appropriate (61/65). Overall, the themes for improvement included not fluid restricting in hypernatraemia and appropriateness of fluid choice for IV rehydration.

Table 6.2 Fluid used for intravenous rehydration in patients with hypernatraemia	Number of patients	%
Intravenous 0.9% sodium chloride	65	45.8
Intravenous 5% dextrose	61	43.0
Oral water	18	12.7
Nasogastric water	17	12.0
Not actively treated	10	7.0
Intavenous 0.45% sodium chloride	7	4.9
Hartmann's solution	5	3.5
Desmopressin	2	1.4

Clinician questionnaire data

There were 44 patients with hypernatraemia who died, seven deaths were indirectly related. Five deaths were discussed at local morbidity and mortality (or similar) meetings and the themes identified were around failure to monitor sodium levels, renal function, and oral intake (appropriate fluid balance) and lack of senior review over a number of days during the admission.

Despite the lack of organisational focus on the assessment and management of hypernatraemia, 38/65 (58.5%) patients with hypernatraemia had their overall care graded as 'good practice' (F6.2). This was better than for those patients with emergency admission hyponatraemia (111/265; 41.9%) or postoperative hyponatraemia (26/183; 31.3%). This higher grading of 'good practice' may reflect that the diagnosis of the cause is usually less complex than hyponatraemia and does not require the interpretation of blood and urine osmolalities, urine sodium, other blood test or investigations.

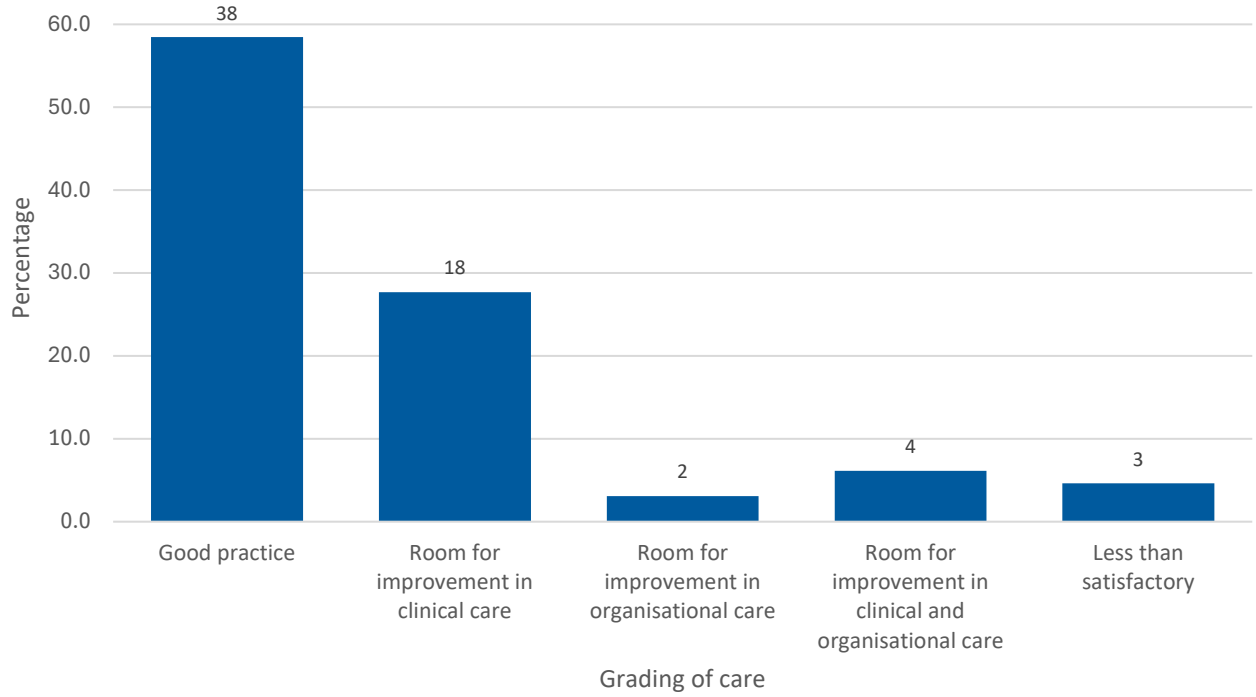

Figure 6.2 Overall quality of care for patients with hypernatraemia

Reviewer assessment form data (n=65)