Keywords: Oral fluid intake/ Dehydration/Older people/Risk assessment/Hospital admission
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In this article...

- Why older people are at increased risk of becoming dehydrated
- The process of developing a new assessment tool for use in clinical practice
- Assessment of the effect of the protocol compared with pre-implementation practice

A protocol for assessing the risk of dehydration in older people

Nursing Times Self-assessment

Key points

1. **Dehydration is common among older people staying in hospital and can delay recovery**
2. **The risk of dehydration in older people must be recognised and dealt with promptly**
3. **A nurse-led assessment protocol to measure the short-term risk of poor oral fluid intake is feasible**
4. **Effective staff training is needed when introducing new protocols or tools**
5. **Involving staff in the development of a new assessment tool can encourage them to improve their practice**

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Abstract Older people admitted to hospital are particularly susceptible to dehydration, which can exacerbate their symptoms, worsen their condition and increase their risk of death. That risk must be recognised and dealt with promptly, but there are currently no standardised assessment protocols. We developed a nurse-led risk assessment tool, the Northumbria Assessment of Hydration (NoAH), which allows staff to determine patients' risk of dehydration and intervene appropriately. A comparison of medical records before and after the introduction of the tool showed widely improved documentation. This article describes the process of creating, testing and refining the tool, which appears to be a useful addition to initial patient assessments.

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Older people admitted to hospital are more susceptible than other patients to dehydration due to pre-existing and/or acute health problems. Thirst is a distressing symptom, and even mild dehydration can exacerbate confusion, precipitate acute renal failure, increase the risk of deep vein thrombosis and prolong hospital stay (National Institute for Health and Care Excellence, 2013). With more than two million unplanned admissions of people over 65 annually in the NHS, accounting for 68% of emergency hospital bed days (Imison et al, 2012), keeping these patients well hydrated is a significant challenge.

Older patients are particularly vulnerable because conditions that commonly affect them can cause cognitive, swallowing, communication and movement difficulties that inhibit them from seeking to drink, drinking sufficiently or drinking at all; it has been reported, for example, that two-thirds of acute stroke patients are dehydrated at least once during hospital admission (Rowat et al, 2012), which puts them at increased risk of death (Royal College of Physicians, 2015).

The risk of insufficient oral fluid intake during a hospital stay must be recognised and dealt with promptly; Francis (2013) highlighted shortcomings in the documentation of fluid balance, but there are no standardised risk assessment tools or protocols. To address this problem we developed a nurse-led risk assessment protocol, the Northumbria Assessment of Hydration (NoAH), which allows staff to determine patients' risk of dehydration and intervene accordingly, by checking patients are taking enough oral fluids, encouraging or helping them to do so, or supplementing fluid intake.

How NoAH was created

To create NoAH we used three sources of data:

Table 1. **Audit results before and after NoAH**

Patient characteristic	Baseline (before use of NoAH), *n* = 93	After use of NoAH, *n* = 624		
		NoAH used, *n* = 177	NoAH not used, *n* = 190	NoAH not needed, *n* = 257
Mean age, years	81.8	80.1	79.8	82.6
Female, *n* (%)	57 (61.3)	108 (61.0)	122 (64.2)	166 (64.6)
Diagnosed with stroke, *n* (%)	34 (36.6)	38 (21.7)	58 (30.9)	77 (29.9)
Fluid balance documented, *n* (%)	5 (5.4)	149 (84.7)*	157 (83.1)	245 (96.8)
Urine output documented, *n* (%)	1 (1.1)	141 (80.1)*	151 (80.7)	224 (88.9)
Drinking ability documented by nurse, *n* (%)	10 (10.9)	140 (79.5)*	136 (72.3)	217 (85.1)
Drinking preferences documented by nurse, *n* (%)	10 (10.9)	64 (36.4)*	58 (30.9)	82 (32.2)

Percentages do not always add up to 100% due to missing data. *Statistically significant compared with baseline (*P*=<0.001)

- Semi-structured interviews with nurses, healthcare assistants and domestic staff to understand current practice and explore their opinions about using a formal assessment protocol; we also sought the views of patients and families on what actions they felt would be reasonable to support oral fluid intake;
- A systematic literature review to identify existing assessment tools and non-invasive dehydration prevention measures;
- A baseline audit of medical records of 93 patients – aged 65 and over or those with the presenting problem of a stroke at any age – from six wards (three stroke care and three wards providing care for older people) across four hospital sites to determine how risk of dehydration and ability to drink independently were documented on admission, and how care processes such as fluid balance chart completion were conducted.

Interviews

From interviews with 55 staff members and five patients or relatives, three requirements emerged:

- Screening is needed to exclude patients who do not need dehydration risk assessment – for example, those already receiving intravenous fluids;
- The risk assessment should be quick to use, done within 24 hours of admission and repeated in the following 24 hours;
- A simple system is needed to guide staff responses – for example, a colour code (green, amber and red) for risk categories.

Staff stressed that the tool needed to be simple and intuitive because of the already high volume of paperwork. It also emerged that patients' drinking preferences were often known but not documented, and that the process for sharing this information varied.

Interviews with patients and relatives revealed that the visiting hospital shop trolley made some patients think they had to pay for drinks and they therefore declined them when offered from the drinks trolley. Others did not want to bother staff, who always seemed busy, by asking for a drink, and some were reluctant to take extra fluids at night to avoid needing the toilet more frequently.

Literature review

The literature review identified 23 relevant articles – nine described dehydration risk assessment tools and/or simple methods to increase oral fluid intake (McIntyre, 2011; Mentes and Wang, 2011; Vivanti et al, 2010, 2008; Wotton et al, 2008; Keller, 2006; Mentes and Iowa-Veterans Affairs Nursing Research Consortium, 2000; SEPT Community Health Services Bedfordshire, 2012; Zembrzuski, 1997) – but most focused on patients who were already dehydrated and/or the settings were not directly relevant.

Clinical features commonly associated with dehydration included dry mucosal membranes, low blood pressure and confusion, but Beattie et al (2014) found that staff lacked knowledge of fluid requirements and dehydration risk factors. Small observational studies reported fluid intake could be improved by understanding patients' drinking preferences and providing extra opportunities for staff to offer drinks or prompt patients to drink (Robinson and Rosher, 2002; Simmons et al, 2001; Spangler et al, 1984).

During interviews with staff members, we asked how useful they thought the 23 articles would be in helping us create our own tool.

Baseline audit

The medical records of 93 consecutive patients were inspected for documentation on fluid balance, urine output, and drinking ability and preferences (Table 1). Despite a prompt in the standard paperwork completed by nurses on admission, there were uncertainties about the assessment of drinking and when to maintain a fluid balance record for patients not receiving intravenous fluids – as a result this part of the documentation was often uncompleted.

Confusion was documented in 27 of the 93 patients, 18 had communication difficulties and 12 fully depended on staff for oral fluid intake. While information about confusion and communication problems was often recorded, it was not formally documented whether these issues negatively affected patients' ability to drink.

How the tool works

The NoAH tool is intended to be used with all patients aged 65 or over and those of any age who have had a stroke. It comprises:

- Four screening questions;
- Eight risk-assessment questions to establish risk score and risk category;
- A response protocol for staff to take action according to risk.

The screening questions allow staff to exclude patients who do not need to be assessed and monitored with NoAH. These are patients:

- Receiving palliative care;
- Receiving IV fluids;
- Who are nil by mouth;
- Who have oral fluid restrictions.

The risk assessment questions allow staff to determine patients' risk score (range 0-10) and category (low = score of 0

Table 2. **NoAH assessment results**

Risk assessment question	Patients with 'yes' answer (total *n* = 177), *n* (%)
Is the patient receiving thickened fluids?	4 (2.4)
Does the patient have a severe visual problem?	18 (10.8)
Would the patient be unable to communicate their needs?	16 (9.6)
Is the patient prescribed furosemide or bumetanide?	37 (22.2)
Is the patient prescribed antibiotics (oral or intravenous)?	63 (37.7)
Has the patient had diarrhoea and vomiting in the last 24 hours?*	8 (4.8)
Does the patient have a dry tongue and/or mouth?	7 (4.2)
Does the patient appear to be confused?	42 (25.1)
Please observe the patient locate a glass or cup, pick it up and take a drink. Can they complete this?**	
● Independent	128 (76.6)
● Partial	29 (17.4)
● Unable	10 (6.0)
Risk category**	
Low	90 (53.9)
Medium	72 (43.1)
High	5 (3.0)

Percentages do not always add up to 100% due to missing data. *This question was later removed from the NoAH assessment protocol. **Figures calculated based on 167 fully completed forms

or 1; medium = 2-4; high = 5+). For clarity each risk category has a specific colour and geometrical shape:

- Low risk – green circle;
- Medium risk – amber square;
- High risk – red triangle.

The response protocol comprises three stages that match the three risk categories; each includes a range of actions to be undertaken by staff, such as identifying drinking preferences, asking patients to fill in the fluid intake monitoring chart, prompting/helping them to drink, informing other staff of patients' needs, and considering subcutaneous fluids. One action is to inform family members that they can help their relative to drink and/or record drinks on the chart.

An initial risk assessment using NoAH is to be carried out within 24 hours of arrival on the ward; risk score and category are to be reviewed once within 24-48 hours of admission.

Testing NoAH in practice

To test its feasibility and acceptability in clinical practice, NoAH was deployed in two wards caring for older people (one acute and one community) and two stroke units from March until July 2015. Staff received a 15-minute training session and were encouraged to develop their own processes for integrating the tool into their routines. The research team completed a prospective audit by collecting NoAH forms from patient files; we regularly communicated the completion rates to the ward managers.

Midpoint interviews were conducted with staff to collect their feedback. Relevant data was retrieved from the medical records of all patients aged 65 or over, or diagnosed with a stroke at any age. Statistical comparison with the baseline audit data was performed using Pearson's chi-squared test.

In total, 650 patients were admitted to the four settings in the deployment phase; 26 were excluded as they were <65 years of age and had no stroke diagnosis. Table 1 details the results for the remaining 624 patients, divided into three groups:

- 177 who had a NoAH form ('NoAH used');
- 190 who did not have a NoAH form ('NoAH not used');
- 257 who did not require the use of NoAH because they were already receiving IV fluids (*n* = 217), had a fluid restriction in place (*n* = 10), or both (*n* = 30) ('NoAH not needed').

Compared with the baseline audit, there were considerable improvements in the documentation of fluid balance (5% at baseline versus 88% after NoAH deployment) and urine output (1% versus 83%), and in the nursing documentation of drinking ability (11% versus 79%) and drinking preferences (11% versus 33%). The improvements happened to a similar extent in all three groups, even when NoAH was 'not used' or 'not needed'.

For the 177 patients with whom NoAH was used, the risk questions obtaining the highest number of 'yes' answers were those related to diuretics, antibiotics and confusion (Table 2). Patients in this cohort were classified as follows:

- Low risk: *n* = 90 (54%);
- Medium risk: *n* = 72 (43%);
- High risk: *n* = 5 (3%).

Ten patients could not be classified due to missing information. The mean risk score was 1.5 (median 1, range 0-5).

Refining the tool

The NoAH risk assessment process was refined as a result of staff feedback during and following the deployment phase.

An assessment question on diarrhoea and vomiting was included initially: if, on admission, patients were found to have had diarrhoea and vomiting in the previous 24 hours, their risk score would increase. However, once staff started using NoAH, it became apparent that most admitted patients with a recent bout of diarrhoea and vomiting were already receiving IV fluids and, as such, would be screened out – the question was therefore removed.

In the midpoint and concluding interviews, staff stressed that confusion greatly increases the risk of dehydration, and also said it would be helpful for the protocol to feature a practical assessment of patients' ability to drink independently. The two assessment questions on confusion and drinking ability were therefore given more detailed answers (as opposed to the basic 'yes' or 'no'), with an extra point for patients moderately or severely confused and for those unable to drink independently.

Evaluating the tool

Guided by previous studies and the needs of staff and patients, we have developed a new, simple assessment tool to identify older patients at increased risk of poor oral fluid intake during the early phase of acute hospital admission. The full NoAH assessment, including risk assessment questions and response protocol, can be viewed online at: nursingtimes.net/NoAHTool

A pre- and post-deployment audit showed substantial improvements in the

documentation of fluid balance, urine output, drinking ability and drinking preferences in all audit patients, regardless of whether or not there was a NoAH form in their notes. This is likely to be because the 257 patients who, when screened, were found not to need NoAH may have received particular attention regarding hydration as part of their care – in patients receiving IV fluids, for example, a fluid balance chart is usually completed anyway.

Of the remaining 367 patients, we found that 190 (52%) did not have a NoAH form. It is possible that, for some of them, the protocol was used and the form completed, but the form could later not be found. It is also possible that some patients without a form received the same care as the 177 patients with a form, but no form was completed for them. This could indicate that the development of NoAH has increased staff's awareness of the issues around hydration and changed their approach to the care of people at risk of dehydration.

Post-deployment interviews were conducted with 21 members of staff and, overall, the feedback about NoAH was positive (Box 1). Staff explained that they did not always complete a form if they knew a patient would be screened out by the initial questions (for example, a patient already nil by mouth). This emphasises the need for effective staff training when introducing new protocols, to ensure all staff consistently and correctly complete forms for all patients, regardless of the perceived outcome.

Despite support from the organisation and clinical teams, several factors may have had a negative impact on the use of NoAH during the deployment phase:

- One ward was without a manager for most of the audit;
- Some staff were moved between wards because of a service reorganisation;
- Stocks of NoAH forms ran low despite frequent checks by the audit team.

Such operational factors should be considered when implementing new processes.

NoAH appears to be a useful addition to initial patient assessments but we have not yet demonstrated that it can improve patient health, or compared the effectiveness of the different actions in the response protocol. This requires a large clinical trial with blinded outcome assessment.

Box 1. Staff feedback on the NoAH protocol

"The tool backs up my thinking; before, I was mentally assessing and now, I can see the process in front of me."

"I think there is value in having overall hydration education, such as needs and consequences etc. It was nice to be included in the development and know [from] *where and why something came* [about]*."*

"There is definitely a need for the tool because, even though it's in the notes, the tool is right in front of you and you don't have to go searching for the information, so you can see quickly people's needs."

"The form for the assessment itself was a two-minute job."

Conclusion

NoAH is a simple nurse-led assessment protocol that staff can use to measure the risk of insufficient oral fluid intake in older patients admitted to hospital, and ensure they remain well hydrated. When we tested NoAH in practice, we observed large increases in the documentation of relevant information such as fluid balance and urine output, in all patients, even those for whom the tool was not recorded as having been used. This suggests that involving staff in the development of NoAH increased their awareness of issues around hydration and encouraged them to improve care.

Further modification, training and audit are required to improve completion of the NoAH form. The project findings have been discussed at senior nurse forums and care of older people away days, and the protocol has been approved for use across the trust. It is being introduced to sites gradually to allow for uptake, and a further audit will take place with the aim of encouraging integration. **NT**

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