

It's time to take nutrition and fluid balance seriously

Richard Leach and colleagues explain why ensuring that patients' nutrition and hydration are adequate makes clinical and financial sense



Provision of appropriate nutrition and hydration is a hallmark of compassionate care but is often neglected in all types of healthcare.¹⁻⁵ The problem is not new and has been reported in the medical literature for nearly four decades.^{6,7} The consequences are clinically and financially costly. The estimated excess UK health related costs of malnutrition are at least £13bn annually.¹

Patients with malnutrition have a deficit of energy, protein, vitamins, or minerals, and this has measurable adverse effects on the body.² Those at risk include patients with poor intake or appetite, dysphagia, chronic disease, or poor functional and social or cognitive ability. Defining adequate hydration is complex. It is estimated by the synthesis of clinical indicators (such as confusion, tachycardia, blood pressure, and thirst), serum biochemistry (such as urea and creatinine), tissue perfusion markers (such as urine output, lactate levels), and urine specific gravity. We examine the scale of malnutrition and poor hydration in our hospitals and communities, explain why it matters, and put forward proposals for change.

Big problem with bad press

The UK national nutrition surveys estimate that over three million people are either malnourished or at risk of malnutrition, of whom more than 90%, or 2.7 million, are cared for in the community (see box 1 in version on bmj.com).^{1 3 5 8} One in three patients admitted to hospital or a care home and one in five admitted to mental health facilities were malnourished or at risk of malnutrition, four national surveys showed (31 646 people admitted to hospital, 3404 to care homes, and 1206 to mental health facilities).⁸ Nutritional status often declines further after admission to hospital because acute illness or injury can impair appetite, swallowing, and intestinal absorption. Similar problems occur in other countries.^{2 9 10}

The health ombudsman for England, Ann Abraham, found a lack of access to fresh drinking

water and inadequate help with eating in half of cases during her investigations into care of older people.¹¹ She described this as incomprehensible and said that everybody working in the NHS, including doctors, nurses, managers, and chief executives, had a responsibility to deliver adequate fluid and nutrition. Her findings are not isolated.^{12 13} The Care Quality Commission (CQC) reported that just 51 of 100 acute NHS hospitals fully complied with their standards for meeting patients' nutritional needs.¹² The commission's dignity and nutrition report on the inspection of 500 care homes in 2012 is currently awaited.¹² Age UK's campaign "Hungry to be heard" and the Patients' Association report *Malnutrition in the Community and Hospital Setting* both indicate inadequate provision of easily accessible food and hydration in all types of healthcare facility.^{5 13}

Box 2 | Key NICE recommendations on nutrition support in adults²

- Screening for malnutrition or the risk of malnutrition should be carried out by healthcare professionals with appropriate skills and training
- All hospital inpatients should be screened on admission and all outpatients at their first clinic appointment. Screening should be repeated weekly for inpatients and, when there is clinical concern, for outpatients. People in care homes should be screened on admission and when there is clinical concern
- Nutrition support should be considered in people who are malnourished, as defined by any of the following:
 - Body mass index (BMI) <18.5
 - Unintentional weight loss greater than 10% within past 3-6 months
 - BMI <20 and unintentional weight loss greater than 5% in the last 3-6 months.
 - People who have eaten little or nothing for more than 5 days or are likely to eat little or nothing for the next 5 days or longer
 - People who have a poor absorptive capacity, high nutrient losses, or increased nutritional needs from causes such as catabolism

Importance of nutrition and fluid management

Malnutrition is associated with increased morbidity and mortality in acute and chronic diseases.¹⁻³ Complications associated with malnutrition can arise within days in people with little or no nutritional intake and may precede major weight loss.

In wound healing, malnutrition prolongs the inflammatory phase, decreases fibroblast proliferation, alters collagen synthesis, and ultimately reduces wound tensile strength.¹⁴ Thus malnutrition is associated with increased risk of pressure ulcers, delayed wound healing, wound infections, and chronic non-healing wounds. Malnutrition also impairs the immune system by suppressing cell mediated immunity, complement systems, phagocyte function, cytokine production, and antibody response and affinity.¹⁵ In an observational study, hospital inpatients identified as high risk by the nutritional risk index were at three times the risk of nosocomial infection as similar patients who were well nourished.¹⁶ Malnutrition is associated with a twofold to threefold increased risk of postoperative complications.^{1 2 8 10}

Malnutrition also affects patients admitted to hospital with conditions such as stroke, pressure ulcers, or falls. Increased morbidity secondary to malnutrition prolongs hospital stay by an average of three days and increases readmission rates by up to 50%.^{1-5 9 10} The effect of poor nutrition is particularly severe in older people.

Chronic malnutrition is associated with frailty, unintentional weight loss, weakness, immobility, sarcopenia, and poor endurance. Those who are malnourished visit their general practitioner twice as often as the well nourished and are three times more likely to be admitted to hospital, irrespective of other conditions.⁴ They also experience more complications and higher death rates in all age groups and disease categories.^{1-5 9 10}

People who are at risk of malnutrition also seem to experience adverse outcomes. For example, in a recent, large multicentre study (n=5051) in 12 countries and 26 hospital departments, patients



at risk of malnutrition had a 12-fold increase in hospital mortality.¹⁰

Dehydration and overhydration are well recognised causes and consequences of illness and injury. The association between intravenous fluid overload and subsequent morbidity and mortality is rarely recognised by regulatory authorities because of the difficulty in attributing cause and effect. Overhydration manifested as pulmonary oedema is a common consequence of excessive intravenous fluids. Pulmonary oedema can be rapidly corrected with diuretic therapy. However, the pneumonia that may follow may not be considered a fluid related complication and is rarely reported. In postoperative patients fluid mismanagement has been documented in 17-54% of cases and contributes to about 9000 deaths annually in the United States.¹⁷⁻¹⁹

Improving malnutrition and poor fluid management makes financial as well as clinical sense.²⁰ The National Institute for Health and Clinical Excellence (NICE) has identified improvements in nutritional care as the fourth largest potential source of NHS savings.² A malnourished patient costs the NHS £2000 a year.¹⁰ The cost of poor fluid management has not been established. However, it may be considerable if problems such as acute kidney injury from avoidable dehydration are added to those related to excess fluid administration (pulmonary oedema, post surgical ileus, wound breakdown, and so on).^{17 18}

Mismatch between guidance and reality

NICE has issued clear guidance on nutritional screening, dietary requirements, and care of those people identified as at risk (box 2).² However, despite the scale and impact of poor nutrition and hydration these standards are often not met. Many factors may contribute to poor implementation, such as poor training, lack of time, competing tasks, and a perception that basic care is less important than other duties or the responsibility of others (box 3 on bmj.com).

Screening

The first job is to identify people who may be malnourished. In the UK 93% of malnourished people, or those at risk of malnutrition, are living in their own homes, and 5% are in care homes. NICE guidelines state that GPs should screen all patients' nutrition on registration, care homes should screen people on enrolment, and hospitals at the first outpatient appointment. However, two thirds of the patients admitted to hospital who are malnourished or at risk of malnutrition come directly from their own home, suggesting the need for improved recognition and management of nutritional problems in the community.

The remaining 2% of those who are malnourished or at risk of malnutrition are in hospital. Admission to hospital provides a vital opportunity to identify malnutrition and initiate treatment, which can then be continued in the community. NICE guidelines say that adults' nutritional status should be screened on admission. Most hospitals recognise that screening with validated nutritional tools such as the Malnutrition Universal Screening Tool should be part of basic clinical care,^{1-3 21} but many lack robust systems to ensure it is done or the results acted on.

Recognition

In hospital, poor documentation of fluid balance and nutritional intake contributes to morbidity and mortality.^{17 18 22-25} Less than half of fluid balance sheets are completed adequately, and in complex cases, electrolyte (biochemical) monitoring is often poor.^{17 18 25} One in three nurses does not feel competent to recognise or treat malnutrition or fluid management.¹²

Appropriate treatment

Assuming the patient can swallow safely, the first step is to maximise normal food intake with a balanced mixture of protein, energy, fibre, electrolytes, vitamins, and minerals. Some hospitals and care homes continue to offer unsuitable menus with insufficient provision for food preferences, ethnic and religious needs, or portion sizes.^{2 5 13}

A different approach may be needed for patients who have lost their appetite. Cochrane meta-analysis shows little or no benefit from dietetic intervention for malnutrition accompanying acute illness. Oral nutritional supplements, often referred to as "build-up drinks," may help in the short term.¹⁻³ A Cochrane meta-analysis of 42 randomised controlled trials of oral supplements versus standard care in malnourished elderly hospital patients showed a mean 2.2% increase in weight (95% confidence interval 1.8 to 2.5) and reductions in a composite outcome of complications such as infection, deep vein thrombosis, and pressure sores (relative risk 0.86 (0.75 to 0.99)).²⁶

The use and prescription of short term oral nutritional supplements is variable and controversial in the UK because of perceived recent rapid increases in their costs and reported inappropriate use and wastage. Properly planned nutritional care should reduce inappropriate use and improve individual patient outcomes. Although demand (and associated expenditure on supplements) is likely to increase, the overall treatment costs should fall significantly.^{1-3 27}

When oral nutrition is not possible or is inadequate, enteral tube feeding or intravenous nutrition is needed (or both). Both methods carry risk. In 2009-10, 41 "never events" were reported to the National Patient Safety Agency, where a misplaced nasogastric or orogastric tube was not detected before use.²⁸ The National Confidential Enquiry into Patient Outcome and Death found that 81% of patients receiving intravenous nutrition did not receive quality care, characterised by thorough assessment, appropriate intravenous feed, safe intravenous access, and electrolyte monitoring, delivered by a trained team.²⁹

Prescribing and delivering fluids also have problems.⁴ Volumes and types of fluid prescrip-

Perceived lack of interest among senior clinicians in engaging with nutritional issues often has a detrimental effect on the team

tion are often inappropriate.^{17 24} For example, in studies of postoperative patients there was little correlation between fluid and electrolytes prescription

and preoperative weight, serum electrolyte levels, or ongoing fluid losses.¹⁷ Only 26% of intravenous fluid prescriptions were administered at the prescribed rate; 67% were infused too slowly and 8% too fast.²⁴ Lack of routine and careful fluid assessment during ward rounds led by senior clinicians and pharmacists is likely to play a part. Decisions may be left until out of hours periods, when junior doctors must prescribe fluids for patients they do not know, although formal evidence for this is lacking.

Junior clinicians and nursing staff lack basic knowledge of nutritional care and fluid and electrolyte management. Half of new foundation doctors lack the basic knowledge to prescribe perioperative fluid safely.^{22 25 30 31} Less than half of trainees know the sodium content of 0.9% saline, suggesting that many do not know the normal daily fluid and electrolyte maintenance requirements or use this knowledge in daily fluid management practice, a suspicion supported by audit data.²⁵ Although undergraduate and foundation curriculums include the essential information for safe fluid prescription, it is often piecemeal and rarely consolidated to provide practical guidance, and competency is not robustly monitored.²² This is because core general education aligns poorly with specialist training programmes and is often considered less important.^{19 22}

Way forward

Considerable, but uncoordinated, efforts have been made to provide high quality guidance on solving these problems, with over 20 initiatives, guidelines, quality standards, and nutritional indicators published in service frameworks commissioning guidelines since 2000.¹⁻⁵ Yet there has been a failure to translate this knowledge into high quality care and nutritional and fluid management standards.

One reason seems to be the haphazard and variable adoption of the plethora of available and potentially confusing guidelines. This suggests a need for “central” responsibility and coordination of implementation, monitoring, and choice of the most cost effective services. The second important issue has been lack of appreciation, engagement, and education of patients, carers, healthcare professionals, managers, commissioners, and government executives about the importance of nutrition and hydration in terms of healthcare outcomes, service use, and NHS costs.

Delivery of quality, comprehensive, patient focused nutritional and fluid care requires a coordinated, uniform, and monitored approach from government, organisations, managers, clinical staff, and the public (box 4). Communication between these groups should be clear and effective. Achieving these goals requires change.

Central leadership and responsibility

The government must make adequate nutrition a priority for the National Commissioning Board, as well as public health policies. England is working to ensure implementation of good nutritional care for all older people.

Policy change and development

The new Health and Social Care Act is not clear how cross-cutting clinical themes such as nutrition and fluid management should be dealt with in national policy. This needs to be corrected.

Clinical commissioning groups should consider appointing executive leads responsible for good nutritional care. The British Association for Parenteral and Enteral Nutrition (BAPEN) has produced a toolkit for commissioners and providers to help them deliver high quality nutritional care and fluid management services.³

Professional bodies and other organisations

A coordinated approach from professional bodies and charities is needed to implement a uniform nutrition strategy. BAPEN is helping with this.

Implement current guidelines

Many guidelines exist to improve the quality of nutritional care.¹⁻³⁻⁵ Implementation of NICE nutrition guidance would save clinical commissioning groups about £28 500 per 100 000 popu-

Box 4 | How to improve nutritional and fluid management

Government

Include nutritional care in its mandate to the National Commissioning Board
Appoint a senior leader with overall responsibility for nutrition

Department of Health

Embed nutritional care into policy
Appoint a national clinical director for nutrition and hydration
Use the appropriate system levers to incentivise providers

Regions and clinical commissioning groups

Appoint executive leads for nutrition
Take responsibility for commissioning nutritional care
Include in contracts and national targets

Acute trust and providers

Reliable systems, with nutrition steering committees and nutrition support teams
Education for all frontline staff
Ensure nutrition screening and planned care

Patients and public

Increased awareness of malnutrition
Self management

lation every year.²¹ Various monitoring and audit systems are available to enable organisations to document achievement of key targets and key performance indicators—for example, nutrition dashboards and the patient environment action teams annual assessments.³²

Senior clinicians and managers' responsibility

Perceived lack of interest among senior clinicians in engaging with nutritional issues often has a detrimental effect on the views of the wider medical team. Nutrition and hydration should not be delegated to junior clinicians. Teams must develop an approach to dealing routinely with fluid management and nutritional care on ward rounds despite competing demands. Simple measures such as ward round checklists may improve fluid management and nutrition.³³

Identifying who is responsible and accountable for nutrition and hydration at an organisational level is necessary but challenging. It will involve coordination of different professional groups, departments, and organisations. Many organisations do not have senior clinicians or executives with responsibility for nutrition and hydration. The emphasis on nutrition and hydration must extend from board rooms and into the wards, clinics, and community services.

Every trust should have reliable systems within its management and governance frameworks to ensure delivery of high quality nutrition and fluid management targets. This should include a multidisciplinary nutrition support team that reports to a nutrition steering committee. An identified senior clinician should act as the trust's “nutri-

tion champion.” The NICE quality standards released in 2012 should facilitate delivery of better nutritional care, including the required nutrition screening and care planning standards.³⁴ NICE guidance and quality standards on intravenous fluid prescribing are also due in 2013. Achievable key performance indicators may be needed.

Education for staff, patients, and carers

Medical and nursing graduates need minimum levels of competence in nutrition and fluid management, such as those developed by the Academy of Medical Royal Colleges' Intercollegiate Group on Nutrition.³⁴ Basic principles of nutritional care and intravenous fluid prescription must be embedded in general and specialty training programmes. Some e-learning materials are now available. The Royal College of Physicians has raised the importance of improving general medical training on vital core medical competencies (including fluid management and nutrition) often neglected in specialty training programmes.

In a busy ward environment it is easy to overlook the basic requirements of humane, compassionate care. Staff should ensure that food and fresh drink are within easy reach and that mealtimes are protected. Red trays can act as a visible indicator to all staff of vulnerable or malnourished patients who need additional support with eating and careful monitoring of food intake. Relatives should be allowed access to the wards to help at mealtimes when feeding is a problem.

The importance of educating patients and carers in optimal nutrition is often overlooked and can be tackled at the bedside, in consulting rooms, and through educational material such as leaflets. Relatives appreciate the opportunity to help with this vital and intimate aspect of care.

Time to act

Now is the time to take fluid and nutrition seriously, not only within hospitals but also in care homes and the community. Failure to deal with these essential but often complex issues has profound, often avoidable effects on morbidity and mortality and results in unnecessary costs.

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