

What you need to know about malnutrition in older adults

Kerry Cheah¹

Amy Illsley¹

Author details can be found at the end of this article

Correspondence to:
Kerry Cheah;
kerry.cheah@doctors.org.uk

Abstract

Malnutrition is the disturbance of normal form or function, arising from the deficiency of one or more nutrients, and is a significant issue in the older adult population. Despite their reduced energy requirements, older patients need the same protein intake and micronutrients as younger patients, but age-related changes may impact the ability to meet these requirements. The cause of malnutrition in individuals is likely to be multifactorial and can therefore be complex to manage. Adequate nutrition is important for both community dwelling patients and inpatients, as malnutrition increases the risk of complications and the likelihood of needing residential or nursing home care on discharge. This article discusses the risk factors for the development of malnutrition in older patients and the different nutritional assessment tools available. Management strategies for optimising nutrition can be divided into systems and supplementation. With an ageing population, most doctors will inevitably become increasingly involved with treating older patients and this article highlights the need to consider a patient's nutritional status. Nutrition should be considered during every ward round and the multidisciplinary team as a whole should maintain an awareness and responsibility for managing malnutrition.

Key words: Elderly; Geriatric; Malnutrition; Nutrition; Older adults

Submitted: 5 July 2020; **accepted following double-blind peer review:** 31 July 2020

Introduction

Nutrition is an important factor to consider when assessing and managing care for older adults. Studies have shown that 5–10% of community dwelling older people are malnourished and this figure will be higher in institutionalised patients or those that are admitted to hospital (Milne et al, 2009). Undernutrition rather than overnutrition is generally thought to be the major concern in this population (Milne et al, 2009). There are many physiological changes of ageing, in multiple systems, which make malnutrition more likely to occur. Assessing and managing malnutrition can be difficult. After all, how often do we see multiple full bottles of nutritional supplements on a patient's bedside table? In addition to this, malnutrition also presents complex ethical decisions with regards to artificial feeding, causing dilemmas for clinicians and affecting patients and their relatives.

Nutritional status: physiological, psychological and social changes associated with ageing

In general, older people have reduced energy requirements and thus require less dietary intake to maintain their energy levels. This is a result of decreased basal metabolic rate, related to a reduction in muscle mass and reduced physical activity. Despite the reduced amount of food required for adequate energy, the protein and micronutrient requirement remains the same throughout life (Woodford, 2016). There are multiple changes that happen during the ageing process that increase likelihood of malnutrition (**Table 1**).

Cognitive impairment is often a significant contributor to weight loss and undernutrition. The relationship between cognitive impairment and malnutrition is multifactorial. Poor memory will lead to forgetting to have meals or go to the shop. Difficulty with sequencing and coordination make the physical act of eating difficult. Agitation and wandering will increase energy demands and the swallowing difficulties that accompany dementia will also have an impact (Webster-Gandy et al, 2012).

How to cite this article:
Cheah K, Illsley A. What you need to know about malnutrition in older adults. *Br J Hosp Med*. 2020. <https://doi.org/10.12968/hmed.2020.0393>

Table 1. Age-related factors that contribute to malnutrition

Physiological	Tooth decay and poor dentition
	Reduced production of saliva
	Reduction in senses (taste, smell and vision)
	Reduced gastric emptying
	Reduction in appetite (anorexia of ageing)
Pathological	Swallowing difficulties associated with neurological disorders
	Chronic disease with increased energy expenditure, for example chronic obstructive pulmonary disease and other inflammatory conditions
	Atrophic gastritis
	Reflux or hiatus hernia
	Malignancy
	Medications and polypharmacy
Psychological	Depression
	Cognitive impairment
Social	Poverty
	Isolation
	Difficulty preparing meals

From Bowker et al (2012); Webster-Gandy et al (2012)

An impaired ability to swallow is a common problem encountered in geriatric medicine. It can be caused by a variety of conditions. Following assessments by speech and language therapist, a modified diet may be advised. Although a swallowing impairment itself may cause malnutrition, a change to a less palatable diet, such as pureed food and thickened fluids, may also have the same outcome. Therefore, such decisions should be made in conjunction with the patient and their relatives.

Malnutrition and its consequences

There is no standard definition of malnutrition. The British Nutrition Foundation defines undernutrition as a disturbance of form or function arising from the deficiency of one or more nutrients (Schenker, 2003). Particularly in older, more frail patients the cause of malnutrition is likely to be multifactorial, thus managing it can be complex.

Malnutrition has negative consequences for patients. Payette et al (1999) reported that unintentional weight loss is associated with morbidity and mortality. Unintentional weight loss may be an indicator of an undiagnosed illness, such as malignancy (Alibhai et al, 2005). Weight loss has also been shown to have detrimental effects for specific conditions. As an example, Ensrud et al (1997) reported that the risk of hip fracture is substantially increased in older women who have lost weight unintentionally.

Malnourished older people admitted to hospital are likely to be at more of a disadvantage, as nutritional status has been shown to decline when in hospital. Poor nutritional intake may go unnoticed on a busy ward and energy requirements are likely to be increased because of illness or surgery (Milne et al, 2009). In addition, weight loss is also associated with increased risk of complications while in hospital and the possibility of being admitted to institutionalised care on discharge (Alibhai et al, 2005).

Frailty has become a major topic of interest in recent years, as it impacts multiple areas of function including mobility and cognition. With an ageing population, frailty is now recognised as a significant problem for health and social care providers and this will certainly persist. Identifying frailty in patients has an impact on treatment decisions made

Table 2. The seven steps Age UK want to effectively implement on every inpatient ward

1	Hospital staff must listen to patients, their relatives and carers
2	All ward staff must become food aware
3	Hospital staff must follow their own professional codes and guidance from other bodies (hospital guidelines, Departments of Health and the Royal College of Nursing)
4	Patients must be assessed for the signs or risk of malnourishment on admission and at regular intervals throughout their hospital stay
5	Hospitals should introduce 'protected mealtimes'
6	Hospitals should implement a 'red tray' system and ensure that it works in practice
7	Hospitals should use trained volunteers where appropriate

From Age UK (2010)

by clinicians, but also highlights those who are vulnerable to even the smallest stressors. Healthcare providers are investing in new services in secondary care and the wider community, specifically for frail patients. Insufficient calorie intake (≤ 21 kcal/kg/day) is independently associated with frailty, in addition to low intake of key nutrients being significantly associated with frailty. The link between frailty and nutrition is likely to result from multiple pathophysiological changes, including energy deficiencies causing weakness and lethargy. Poor protein intake also leads to reduced synthesis of muscle proteins (Bartali et al, 2006). A systematic review found evidence to support an association between nutrition and frailty. It found that the overall quality of a diet is inversely associated with the risk of frailty. The review also looked at the role of nutrition in prevention, or even reversal of frailty and found that there is insufficient evidence (Lorenzo-Lopez et al, 2017). With an ageing population and the increasing prevalence of frailty, research into areas that may play a role in preventing frailty will be important going forward.

In 2006, Age UK started a campaign titled 'Hungry to be Heard'. They produced a document titled *Still Hungry to be Heard* in 2010 with updates. They campaigned for an acknowledgment of how serious the issue of malnutrition was, particularly in hospitals. They then set out key implementation points, entitled 'Age UK's Seven Steps to End the Scandal of Malnutrition in Hospital' (Table 2) (Age UK, 2010).

Assessment of nutrition

There are multiple methods and tools for assessing nutritional status. Nutritional assessments, including testing swallowing and reviewing oral hygiene, make up an important part of a comprehensive geriatric assessment. Assessment should start with a nutritional history and physical examination including recent weight change, dietary intake, satiety, medical conditions and social history along with basic height and weight (Elia and Stratton, 2005). A commonly used tool is the body mass index. This is simple to calculate and there are defined categories that a measurement falls in to. However, there may be limitations to assessing body mass index in older patients. There are often practical reasons that mean a patient cannot be weighed. A normal or even high body mass index may lead to inappropriate reassurance that a patient is not malnourished, for example in patients with nutrient rather than energy deficits, or fluid overload as a result of heart, liver or kidney failure (Elia and Stratton, 2005). A body mass index will also not provide accurate assessment of nutrition in patients with obesity sarcopenia, which is a relatively new concept that encompasses age-related reduction in skeletal muscle mass and increase in visceral fat (Choi, 2016).

Anthropometric measurements can be used to estimate subcutaneous fat. Measurements are obtained by skinfold calliper. The most commonly used measurement is the mid-arm muscle circumference:

$$\text{Mid-arm muscle circumference} = \text{Mid-arm circumference} - (\pi \times \text{tricep skinfold}).$$

Anthropometric measurements are rarely used in an inpatient setting. Measurements are subject to examiner error and results have not been standardised or validated for specific illnesses (Elia and Stratton, 2005).

Multiple screening tools are available to identify high-risk patients in hospital. A review by Shuhada et al (2017) looked at the validity of screening tools including the malnutrition screening tool, malnutrition universal screening tool (MUST), mini nutritional assessment, geriatric nutrition risk index and the subjective global assessment. They found nutritional screening tools are widely used and validated although the subjective global assessment has low validity in geriatric patients and therefore should not be used. It also reported that biochemical markers alone, such as albumin or haemoglobin, cannot be used to determine nutritional status.

The most commonly used screening tool in the UK is MUST (Figure 1). In their study, Stratton et al (2006) found that MUST was easy to use and patients could still be screened

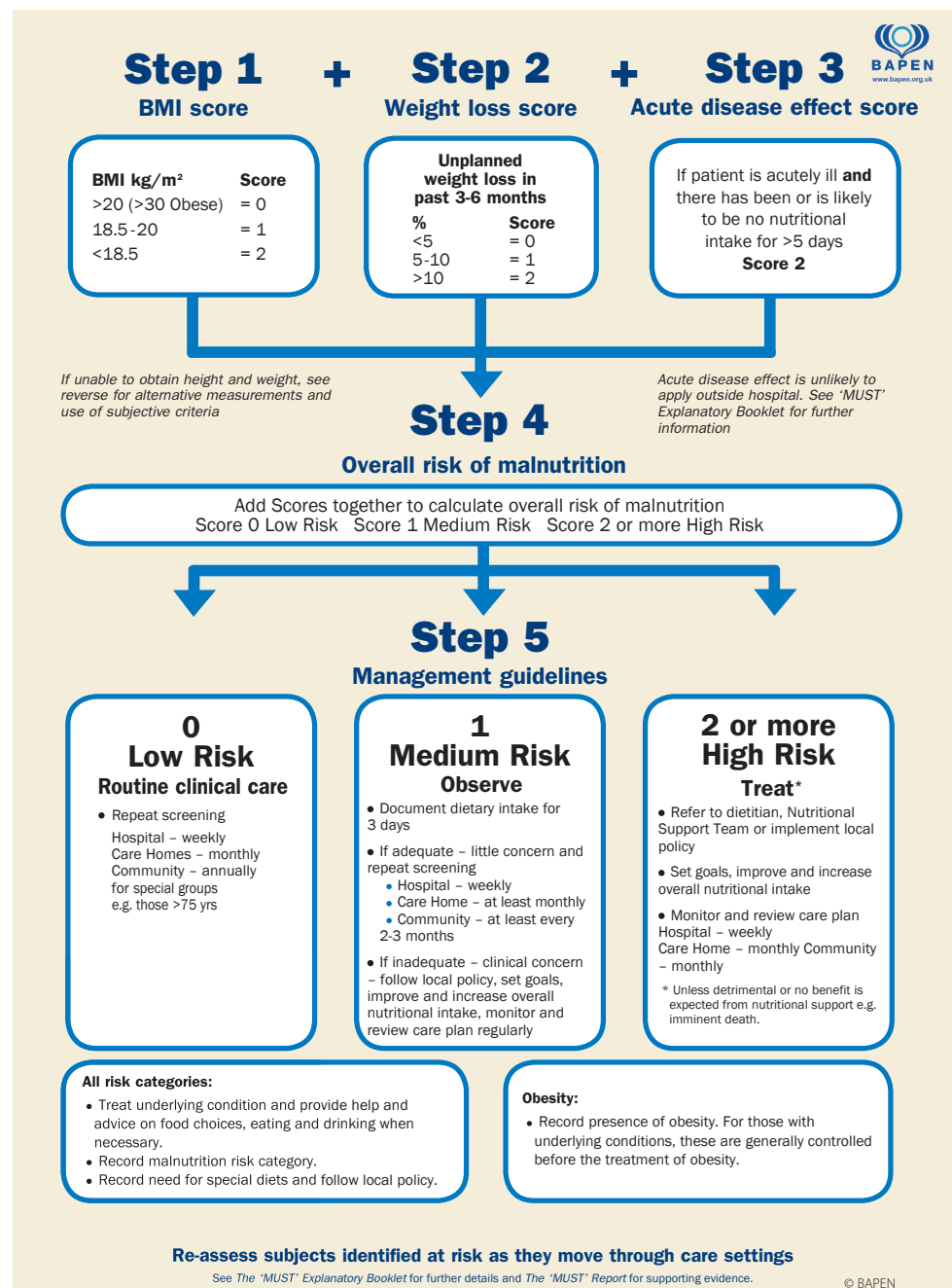


Figure 1. Malnutrition universal screening tool flow diagram including scores and intervention required. From Todorocvic et al (2011).

with MUST even if they were unable to be weighed. The MUST risk also predicted mortality in hospital and 6 months after discharge. They concluded that MUST has predictive validity and can be used routinely for all patients.

Once nutritional status has been assessed and a patient has been identified as being malnourished, it is important to recognise the cause of malnutrition, such as cognitive impairment or malignancy. At this point appropriate interventions can be undertaken but it is important to have patients reassessed throughout admission.

Prevention and management

Management of malnutrition should involve the wider multidisciplinary team including (but not exclusively) dietitians, speech and language therapists, dentists, occupational therapists and nursing staff. Dietitians are well placed to undertake detailed nutrition reviews and also advise on specific supplements.

There have been a variety of systems put in place to highlight the importance of managing and reducing the risk of malnutrition in hospital. These include the red tray initiative, protected mealtimes, supervised dining rooms and the employment of staff specifically to help with feeding at meal times.

The red tray initiative highlights those at risk of malnutrition. Factors including weight, appetite, ability to eat and comorbidities are used to assess whether the patient should have a red tray. The red tray pathway involves a red square icon placed above the bed space. Staff who are involved in delivering meals, including domestic staff, are made aware of those patients who require a red tray. Nurses can then allocate a member of staff to help with the feeding of these patients and ensure food is not taken away without discussing it with nurses first. After mealtimes a food chart should then be completed. Issues with nutrition for particular patients are then flagged up at multidisciplinary team meetings. An audit by Bradley and Rees (2003) found that the red tray system was a practical tool that identified at risk patients and therefore allowed these patients to be supported at mealtimes. However, a systematic review by Wade and Flett (2012) looking at mealtime initiatives argued that there is limited evidence for the effectiveness of these methods and the evidence that exists is low quality.

After dietary advice, oral nutritional supplements are commonly the next step in treating or preventing undernutrition. They are often prescribed for inpatients and patients in community settings. A Cochrane review looking at protein and energy supplementation concluded that supplementation was associated with small weight gain but did not have an overall impact on mortality. However, it can potentially reduce mortality in the undernourished population. They found no difference in the length of hospital stays for supplemented patients, but nutritional supplementation may reduce complications in hip fracture patients (Milne et al, 2009). With regards to hip fractures, malnutrition has negative effects on functional recovery and is associated with higher mortality, which can be reduced by nutritional assessment and intervention (Malafarina et al, 2018).

There is limited evidence for the efficacy of appetite stimulants in older adults. Side effects of these medications are likely to be increased in older people and therefore their use should be considered individually and with care (Levitt and O'Neil, 2018).

With regards to cognitive impairment and dementia specifically, small changes can make a big difference. For older people with cognitive impairment, allowing appropriate duration for meals may reduce agitation and distress. Older people may develop grazing habits, therefore offering nutritious snacks will help meet nutritional requirements. Cognitively impaired patients living in their own home may only have assistance from carers or family for very short periods through the day, so providing advice and tips for optimising nutrient intake is helpful. These small changes include using whole milk; sugar rather than artificial sweeteners; including fried foods in diet; adding butter or cream to cooking and ensuring the availability of snacks. Finger foods are also helpful for older people who have difficulties using cutlery, for example fish fingers, chips, sandwiches, cheese cubes, fruit slices and biscuits. For higher functioning patients with dementia, lunch and cooking clubs or meals on wheels schemes are helpful (Webster-Gandy et al, 2012).

Artificial feeding, whether it is enteral or parenteral, often presents a management dilemma, particularly in the frail older population. The ethical considerations are vast and

Key points

- Malnutrition, particularly undernutrition, is common among older people.
- Malnutrition is associated with mortality and morbidity.
- Nutritional status is likely to deteriorate while a person is in hospital.
- All inpatients should be screened for malnutrition, and interventions should be implemented for those at high risk.
- The malnutrition universal screening tool has been validated as a screening tool and can be used routinely for all patients.
- Biochemical markers alone should not be used to assess malnutrition.
- Malnutrition should be managed by the whole multidisciplinary team and be reassessed throughout admission.
- Decisions regarding clinically assisted nutrition should be made at an individual level following (where possible) discussions with patient and their relatives.

Curriculum checklist

This article addresses the following requirements from the general internal medicine training curriculum:

Internal medicine:

- Nutrition and malnutrition
- Weight loss
- Frailty.

Clinical CiPs:

- Providing continuity of care to medical inpatients, including management of comorbidities and cognitive impairment.

complex and are beyond the scope of this article. Artificial feeding is rarely appropriate in frail older adults and therefore the focus should be on optimising oral intake, but this can be challenging. Decisions regarding artificial feeding should be made on an individual basis with the involvement of the patient, their family and the multidisciplinary team providing their care. The General Medical Council (2010) has produced ethical guidance on clinically assisted nutrition and hydration as part of their guide, 'Treatment and care towards end of life: good practice in decision making'. This guidance defines what is deemed to be clinically assisted nutrition and hydration. It discusses the risks and benefits and the importance of seeking the views of the patients and those closest to them. In addition, it provides advice on considerations in certain circumstances including patients who lack capacity and patients in a persistent vegetative state.

Conclusions

Malnutrition is a common problem in older people and its effects may well be underestimated, particularly in inpatient settings. Given the ageing population, it is likely to increase in prevalence. The cause of malnutrition in older individuals is likely multifactorial, making management complex. Identification of malnutrition is of the utmost importance as it is associated with morbidity and mortality. The MUST screening tool has been validated for routine use for all hospital inpatients, to identify those at risk of malnutrition. Nutrition should be considered during every ward round and the multidisciplinary team as a whole should have an awareness and responsibility in managing malnutrition.

Author details

¹Department of Elderly Medicine, Bradford Royal Infirmary, Bradford, UK

Conflicts of interest

The authors declare no conflicts of interest.

Acknowledgement

Figure 1 is reproduced by kind permission of British Association for Parenteral and Enteral Nutrition. For further information on the ‘malnutrition universal screening tool’ see www.bapen.org.uk

References

- Age UK. Still hungry to be heard. 2010. https://www.ageuk.org.uk/documents/en-gb/for-professionals/health-and-wellbeing/id9489_still_hungry_to_be_heard_report_28ppa4.pdf?dtrk=true (accessed 5 August 2020)
- Alibhai SMH, Greenwood C, Payette H. An approach to the management of unintentional weight loss in elderly people. *CMAJ*. 2005;176(6):773–780. <https://doi.org/10.1503/cmaj.1031527>
- Bartali B, Frongillo EA, Bandinelli S et al. Low nutrient intake is an essential component of frailty in older persons. *J Gerontol A Biol Sci Med Sci*. 2006;61(6):589–593. <https://doi.org/10.1093/gerona/61.6.589>
- Bowker LK, Price JD, Smith SC. Oxford handbook of geriatric medicine. Oxford: Oxford University Press; 2012
- Bradley L, Rees C. Reducing nutritional risk in hospital: the Red Tray. *Nurs Stand*. 2003;17(26):33–37. <https://doi.org/10.7748/ns2003.03.17.26.33.c3357>
- Choi KM. Sarcopenia and sarcopenic obesity. *Korean J Intern Med*. 2016;31(6):1054–1060. <https://doi.org/10.3904/kjim.2016.193>
- Elia M, Stratton RJ. Nutritional screening assessment. In: Gibney MJ, Elia M, Ljungqvist O, Dowsett J (Eds). *Clinical nutrition*. Chichester: Blackwell Publishing; 2005:15–28
- Ensrud KE, Cauley J, Lipschutz R, Cummings SR. Weight change and fractures in older women. Study of Osteoporotic Fractures Research Group. *Arch Intern Med*. 1997;157(8):857–863. <https://doi.org/10.1001/archinte.1997.00440290041004>
- General Medical Council. Treatment and care towards end of life: good practice in decision making. 2010. <https://www.gmc-uk.org/ethical-guidance/ethical-guidance-for-doctors/treatment-and-care-towards-the-end-of-life> (accessed 4 February 2020)
- Levitt A, O’Neil J. Older adults with unintended weight loss: the role of appetite stimulants. *Home Healthcare Now*. 2018;36(5):312–318. <https://doi.org/10.1097/NHH.0000000000000692>
- Lorenzo-Lopez L, Maseda A, de Labra C et al. Nutritional determinants of frailty in older adults: a systematic review. *BMC Geriatr*. 2017;17(1):108. <https://doi.org/10.1186/s12877-017-0496-2>
- Malafarina V, Reginster J, Cabrerizo S et al. Nutritional status and nutritional treatment are related to outcomes and mortality in older adults with hip fracture. *Nutrients*. 2018;10(5):555. <https://doi.org/10.3390/nu10050555>
- Milne AC, Potter J, Vivanti A, Avenell A. Protein and energy supplementation in elderly people at risk from malnutrition (Review). *Cochrane Database Syst Rev*. 2009;(2):CD003288. <https://doi.org/10.1002/14651858.CD003288.pub3>
- Payette H, Coulombe C, Boutier V, Gray-Donald K. Weight loss and mortality in free-living frail elders: a prospective study. *J Gerontol, Med Sci*. 1999;54A(9):M440–M445
- Schenker S. Undernutrition in the UK. *Nutr Bulletin*. 2003;28(1):87–120. <https://doi.org/10.1046/j.1467-3010.2003.00303.x>
- Shuhada NA, Aziz A, Mohd NI et al. Assessing the nutritional status in hospitalized elderly. 2017. *Clin Interv Aging*. 2017;12:1615–1625. <https://doi.org/10.2147/CIA.S140859>
- Stratton RJ, King CL, Stroud MA, Jackson AA, Elia M. ‘Malnutrition Universal Screening Tool’ predicts mortality and length of hospital stay in acutely ill elderly. *Br J Nutr*. 2006;95(2):325–330. <https://doi.org/10.1079/bjn20051622>
- Tordorocvic V, Russell C, Elia M (Eds). The ‘MUST’ explanatory booklet. Redditch: British Association for Parenteral and Enteral Nutrition (BAPEN); 2011
- Wade K, Flett M. Which ‘nutritional models-of-care’ improve energy and protein intake, clinical outcomes and malnutrition in hospitalised patients? *Nutrit Dietet*. 2013;70:7–15

- Webster-Gandy J, Madden A, Holdsworth M (Eds). Older people. In: Webster-Gandy J, Madden A, Holdsworth M, (Eds). Oxford handbook of nutrition and dietetics. New York: Oxford University Press; 2012: 296–304
- Woodford H. Age-related changes. In: Woodford H. Essential geriatrics. Boca Raton (FL): CRC Press; 2016: 10–11