

Compliance with Oral Nutritional Supplements and the Role of Taste



Dr Carrie Ruxton PhD, RD, Freelance dietitian, Nutrition Communications

Malnutrition, related to disease or advanced age, continues to present a challenge for dietitians and other healthcare professionals. No longer dismissed as an unfortunate consequence of the hospital system, malnutrition is now recognised as a health risk to patients and a financial burden to the NHS. Studies on patients using the 'Malnutrition Universal Screening Tool' ('MUST') suggest that the prevalence of malnutrition can be as high as 60 per cent in medical specialities such as gastro-intestinal surgery and care of the elderly, and affects 10-45 per cent of patients in the community.¹ However, the issue often goes undetected and it has been estimated that three million people in the UK are either malnourished or at risk of malnutrition, with the vast majority of these living in the community.²

Malnutrition doubles the risk of mortality in patients, as well as increasing hospital stays, treatment costs and the risk of complications.¹ Estimates suggest that malnutrition costs the UK around £13 billion annually due to additional resource use related to slower patient recovery, medical complications and increased need for support.³ However, a Quality Standard published by the National Institute for Health and Care Excellence (NICE)⁴ suggested that £71,800 per 100,000 people could be saved through improving screening, assessment, treatment and follow-up of patients at risk of malnutrition.

In the elderly, several factors influence the risk of malnutrition. As summarised in **Table One**, these relate to the eating environment, a person's social situation and the characteristics or nutritional content of food and drink.

Table One: Factors Affecting Nutritional Intake in Older Adults

	Promotes Intake	Reduces Intake
Environment	<ul style="list-style-type: none"> • Distraction, e.g. watching TV • Convenient, accessible food • Company at mealtimes • Regular mealtimes 	<ul style="list-style-type: none"> • Social isolation • Meal interruptions • Lack of help with eating • Mealtimes do not suit individual
Personal/social	<ul style="list-style-type: none"> • Good health • Good motivation 	<ul style="list-style-type: none"> • Bereavement • Reduced health • Medication or treatments which reduce appetite • Adverse psychological changes
Food characteristics	<ul style="list-style-type: none"> • High fat content • High energy density • Low volume/small portion • Palatability • Appetising appearance • Variety in flavour and texture • Energy-containing liquids given between meals 	<ul style="list-style-type: none"> • High protein (induces satiety) • High fibre (induces satiety) • Slow digestive carbohydrates (induces satiety) • High viscosity • Large volume/portion • Culturally inappropriate food • Monotonous flavour or texture

Source: Nieuwenhuizen *et al.* (2010)⁵

Tackling malnutrition

As recommended by NICE,⁶ options for addressing malnutrition include oral nutrition support, enteral tube feeding or parenteral nutrition. Of these, oral support is the preferred option, assuming no dysphagia, as it uses the gut, has a lower cost implication and is less invasive. Oral nutritional support may include fortified foods (e.g. with additional energy and/or protein), small frequent meals based on naturally energy dense ingredients, such as cheese and full-fat milk, energy-dense snacks, and/or oral nutritional supplements (ONS).

ONS are multi-nutrient liquids, semi-solid or powder products that provide macronutrients and micronutrients with the aim of increasing oral nutritional intake.⁷ Stratton & Elia (2007)¹ reviewed the findings of 13 systematic reviews and meta-analyses which reported clinical outcomes when ONS were compared with routine care. The results showed a significant benefit for ONS in terms of nutritional intake and weight gain/prevention of weight loss. Some studies also reported clinical benefits such as reduced mortality or complications. A US retrospective study⁸ assessed the impact of ONS on length of hospital stay and probability of readmission. Data from an 11-year period were sourced from a large patient database in order to match a population of ONS users (1.6% of patients) with a similar group of non-users. The results showed that patients given ONS were hospitalised for 2.3 days less than non-users resulting in a saving of \$4734 (£2844) per admission. Patients receiving ONS were also significantly less likely to be re-admitted within 30 days of discharge. In the UK, NICE reported statistically significant increases in weight and reductions in complications and mortality with use of ONS but no differences in duration of hospital stay.⁹ However, an economic analysis suggests that targeted use of ONS in selected groups of patients could be expected to save money by reducing length of stay.¹⁰

Compliance

While the benefits of ONS are clear, clinical outcomes depend on patient compliance, as well as support from key workers and carers. Compliance is when “*patient’s behaviours coincide with healthcare providers’ recommendations for health and medical advice*” or when 80-120 per cent of a medication or treatment is taken.¹¹ In the case of ONS, compliance would mean consuming the prescribed volume of ONS when indicated. The consequences of poor compliance are illustrated by the findings of a study in 109 adequately nourished women¹² treated for hip fracture which revealed a significant association between poor compliance and a greater risk of weight loss.

Estimates of non-compliance with ONS can vary depending on the setting. A systematic review,¹³ which pooled the results of 46 studies involving 4,328 patients, found a mean compliance rate of 78% (range 37-100%), with

better compliance in community settings compared with hospitals. Few differences were seen between medical specialities except for acutely ill or elderly patients where ONS compliance was the lowest, possibly due to smaller appetites and physical disabilities which could hinder intake. Higher compliance rates are generally seen in studies (as compared with typical clinical settings) suggesting that patients would benefit from additional monitoring and feedback. Other factors affecting compliance are summarised in **Table Two**. For ONS, flavour, taste, texture, and predictability of the supplements all affect compliance,¹² with taste being the most important of these.

The importance of flavour

As taste, flavour and texture are key influencers of ONS compliance, it is worth exploring how these are experienced by the patient. As shown in **Figure 1**, the basic tastes of sweet, sour, salty, bitter and umami (protein) are the start of a complex process involving both physiological and psychological responses. Chemical stimuli in foods and drinks activate chemoreceptors on the tongue and in the nose which are responsible for gustatory and olfactory perceptions. Impulses are then relayed to the brain where they join other information about the appearance, texture, temperature and

even the sound of the food.¹⁴ The sensory experience is further influenced by mood, anxiety, eating environment and pleasant/unpleasant associations with particular tastes.

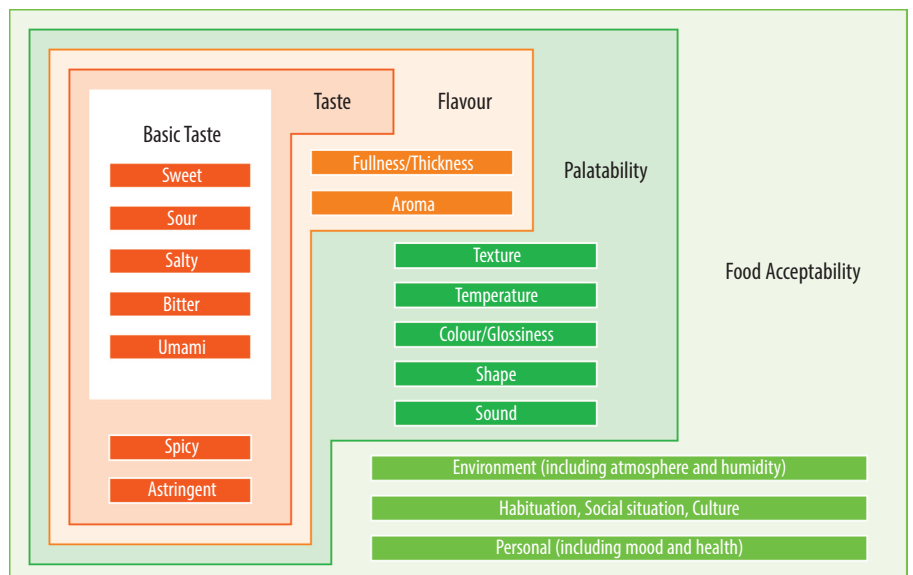
The perception of taste changes during life. For example, babies have an innate preference for sweet tastes as this conditions them to enjoy breast milk which contains 40 per cent energy as lactose.¹⁵ In later life, the sensitivity of the taste buds declines, possibly due to a lower turnover of taste receptor cells, and olfactory impairment becomes more common. In a US survey¹⁶ of nearly 2,500 older people, self-reported olfactory impairment was only 9.5 per cent but this rose to 24.5 per cent when an objective diagnostic test was used. Progressive loss of taste and smell, as well as the impact of disease, disability and medication, can affect appetite in older people, leading to reducing energy intakes and a greater risk of malnutrition. The impact of this on ONS preference was investigated in a group of 36 young adults and 48 older adults, recruited from the general population.¹⁷ Participants were asked to rate their preferences for three flavoured ONS products against a standard sucrose solution. In the blinded test, older adults were found to be less sensitive to sweet taste than younger adults. Despite this, both age groups reported less liking for higher perceived sweetness, even though the ONS products had identical sugar contents.

Table Two: Factors Influencing Compliance

Patient Related	Therapy Related	Other
<ul style="list-style-type: none"> • Attitudes and beliefs • Health literacy • Forgetfulness • Disease factors (e.g. pain, symptoms) 	<ul style="list-style-type: none"> • Type of therapy • Duration of treatment • Treatment complexity • Route of administration • Side effects 	<ul style="list-style-type: none"> • Clinical experience including waiting times • Economic factors • Social support • Inability to take time off work

Adapted from Jin J et al. (2008)³

Figure 1: The Complex Process of Experiencing Flavour



Adapted from Umami Information Center www.umamiinfo.com

Considerations to increase ONS compliance

Improving the flavour and mouth-feel of ONS is vital for boosting compliance, and several trials have examined taste preferences in patients. A study¹⁸ in 109 malnourished in-patients referred for nutritional support found that ratings of pleasantness were greater for milk-based supplements (6.2/10) compared with salty (3.9/10) or sweet (3.1/10) juice-based products. When given a choice, more participants (82%) chose to consume milk-based products rather than juice-based products. The difference in preferences may have been influenced by a greater perceived acidity for the juice-based drinks. This highlights the importance of offering a variety of tastes when trying to improve ONS acceptance in different groups of patients.

A review¹⁹ of the evidence acknowledged that taste changes as a consequence of disease progression or treatment could lead to food aversions, lower energy intakes, weight loss and malnutrition. However, these problems could be helped by offering individual dietetic counselling and by using different flavours of ONS to prevent taste fatigue. Chilling products can also boost acceptability and palatability.¹¹ Manufacturers have responded to the evidence on taste by continually refining ONS flavours and testing consumer responses. Developing ONS is a complex process involving the balancing of nutritional profile, stability of ingredients, texture, cost and taste.

The attitudes of health professionals towards ONS may also be a factor in patient compliance. Lad *et al.* (2005)¹² quizzed 70 health professionals about their views, revealing firm support for the benefits of ONS for patients. However, most health professionals were critical of the taste of ONS and expressed aversion to using ONS themselves, should they ever require nutritional support. It is possible that negative views held by some health professionals about the flavour and acceptability of ONS could risk influencing patients' attitudes and compliance.

Conclusion

Malnutrition is a continuing issue for healthcare professionals and patients, highlighting the importance of proper screening, treatment and follow-up as recommended by NICE and other expert bodies. ONS are recognised as a solution, given their proven impact on energy intakes, body weight, hospital stay and clinical outcomes. However, patient compliance is key in realising the benefits of ONS and varies considerably depending on the care setting. Providing supplements that meet patients' needs in terms of taste and sensory preferences can help to improve compliance. Dietitians and other healthcare professionals can also support patients by expressing positive attitudes about the value and taste of ONS.

Key points

- Disease-related malnutrition is preventable but, at present, represents a considerable cost for healthcare systems and impacts on patient health and wellbeing
- Naturally energy dense foods and oral nutritional supplements are part of the solution
- Patients are more likely to comply with oral nutritional supplements if the products taste good
- Advances in understanding the science of taste can help to improve the taste, flavour and texture of oral nutritional supplements
- Healthcare professionals can improve compliance by expressing positive attitudes about the value and taste of oral nutritional supplements.


Acknowledgement

This article has been supported by an educational grant from Abbott Nutrition. The views expressed are those of the author, and not necessarily those of Abbott Nutrition.


References: 1. Stratton RJ, Elia M (2007). A review of reviews: A new look at the evidence for oral nutritional supplements in clinical practice. *Clinical Nutrition Supplements*; 2:5-23. 2. Elia M, Russell CA (2008). Combating malnutrition: Recommendations for action. BAPEN. Accessed online: www.bapen.org.uk/pdfs/reports/advisory_group_report.pdf (May 2014). 3. Elia M, Stratton RJ (2009). Calculating the cost of disease-related malnutrition in the UK in 2007. In: *Combating Malnutrition: Recommendations for Action*. Report from the advisory group on malnutrition. Ed. BAPEN. 4. National Institute for Health and Care Excellence (NICE) (2012). Implementation Programme: NICE support for commissioners and others using the quality standard on nutrition support in adults. Accessed online: www.nice.org.uk/nicemedia/live/13977/61747/61747.pdf (May 2014). 5. Nieuwenhuizen WF *et al.* (2010) Older adults and patients in need of nutritional support: Review of current treatment options and factors influencing nutritional intake. *Clin Nutr* 29: 160-69. 6. NICE (2006). Nutrition support in adults: Oral nutrition support, enteral tube feeding and parenteral nutrition. Guideline CG32. Accessed online: <http://publications.nice.org.uk/nutrition-support-in-adults-cg32> (May 2014). 7. Lochs H *et al.* (2006). Introductory to the ESPEN guidelines on enteral nutrition: Terminology, definitions and general topics. *Clin Nutr*; 25: 180-186. 8. Phillipson TJ *et al.* (2013). Impact of oral nutritional supplementation on hospital outcomes. *Am J Manag Care*; 19: 121-128. 9. National Institute for Clinical Excellence (NICE) (2006). Nutrition support in adults Oral nutrition support, enteral tube feeding and parenteral nutrition. Accessed online: <http://guidance.nice.org.uk/CG32/Guidance/pdf/English> (May 2014). 10. Elia M *et al.* (2009). The cost of disease-related malnutrition in the UK and economic considerations for the use of oral nutritional supplements (ONS) in adults. BAPEN. Accessed online: www.bapen.org.uk/pdfs/health_econ_exec_sum.pdf (May 2014). 11. Jin J *et al.* (2008). Factors affecting therapeutic compliance: A review from the patient's perspective. *Ther Clin Risk Manag*; 4(1): 269-86. 12. Bruce D, *et al.* (2003). Nutritional supplements after hip fracture: poor compliance limits effectiveness. *Clin Nutr*; 22: 497-500. 13. Hubbard GP *et al.* (2012). A systematic review of compliance to oral nutritional supplements. *Clin Nutr*; 31: 293-312. 14. Institute for Quality and Efficiency in Health Care (2012). How does our sense of taste work? Accessed online: www.ncbi.nlm.nih.gov/pubmedhealth/PMH0033701 (May 2014). 15. Beauchamp GK & Cowart BJ (1985) Congenital and experiential factors in the development of human flavor preferences. *Appetite*; 6(4): 357-72. 16. Murphy C *et al.* (2002) Prevalence of olfactory impairment in older adults. *JAMA*; 288: 2307-2312. 17. Kennedy O *et al.* (2010) Investigating age-related changes in taste and affects on sensory perceptions of oral nutritional supplements. *Age Ageing*; 39: 733-738. 18. Darmon P, *et al.* (2008). Oral nutritional supplements and taste preferences: 545 days of clinical testing in malnourished in-patients. *Clin Nutr*; 27: 660-5. 19. Ravasco P, *et al.* (2005). Aspects of taste and compliance in patients with cancer. *Eur J Oncol Nurs*; 9: 584-91.

Date of preparation: May 2014. RXANI140132

“Malnutrition is a continuing issue for healthcare professionals and patients, highlighting the importance of proper screening, treatment and follow up as recommended by NICE and other expert bodies.”



NOW TEST YOUR KNOWLEDGE
Visit CPD section at: www.nutrition2me.com



The CNPD questionnaire linked to this article has been kindly sponsored by Abbott Nutrition
www.abbottnutrition.co.uk