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Clinical and economic effects of managing malnutrition

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Abstract

With the considerable cost of disease-related malnutrition to individuals and to society, there is a need for effective, evidence-based ways of preventing and treating this condition. Oral nutritional supplements (ONS) are an evidence based way of managing malnutrition. Systematic reviews and meta-analyses consistently suggest that the use of liquid, multi-nutrient oral supplements in the management of malnutrition can improve total nutritional intakes and body weight compared to routine care. Meta-analyses also suggest that ONS can significantly reduce complications (e.g. infections, pressure ulcers), mortality and hospital admissions in some patient groups. Such benefits suggest that the appropriate use of ONS should form an integral part of the management of malnutrition, together with approaches to maximise dietary intakes where feasible. As with all therapies, compliance to ONS needs to be maximised and the use monitored. To make sure that those at risk of malnutrition are identified and treated appropriately there is a need to implement policies that incorporate screening and care plans for the prompt management of malnutrition into routine clinical practice. In doing so, the economic burden of this costly condition can be curtailed. As recently suggested by the National Institute for Health and Clinical Excellence (NICE) in the UK, substantial cost savings could occur if screening and treatment of malnourished patients was undertaken.

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EFECTOS CLÍNICOS Y ECONÓMICOS
DEL TRATAMIENTO DE LA DESNUTRICIÓN

Resumen

Debido al coste considerable que supone para los individuos y para la sociedad la desnutrición relacionada con la enfermedad, hay una necesidad de prevenir y tratar esta situación clínica de modo eficaz y basado en la evidencia. Los suplementos nutricionales orales (SNO) constituyen un método de tratamiento de la desnutrición basado en la evidencia. Las revisiones sistemáticas y los meta-análisis sugieren constantemente que el uso de suplementos multi-nutriente líquidos orales para el tratamiento de la desnutrición puede aumentar la ingesta total de nutrientes y el peso corporal en comparación con la atención habitual. Los meta-análisis también sugieren que los SNO pueden reducir significativamente las complicaciones (por ejemplo, infecciones y úlceras por presión), la mortalidad y los ingresos en el hospital en algunos grupos de pacientes. Estos beneficios sugieren que el uso apropiado de los SNO debe formar parte integral del tratamiento de la desnutrición, junto con las estrategias para maximizar la ingesta dietética cuando sea posible. Como con todos los tratamientos, el cumplimiento de los SNO debe maximizarse y el uso debe ser monitorizado. Para asegurarse de que las personas en riesgo de desnutrición sean identificadas y tratadas adecuadamente, es necesario poner en práctica políticas que incorporen planes de detección y atención para el tratamiento rápido de la desnutrición en la práctica clínica habitual. De este modo, puede reducirse la carga económica de esta costosa situación clínica. Como recientemente ha manifestado el National Institute for Health and Clinical Excellence (NICE) del Reino Unido, se pueden conseguir ahorros importantes si se lleva a cabo la detección y el tratamiento de los pacientes desnutridos.

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Introduction

Healthcare systems with budgetary constraints focus on the use of evidence-based cost-effective treatments. In the current economic climate, it is becoming increasingly important to identify conditions promptly and to treat them in the most clinically and cost effective way. This applies to the treatment of disease-related malnutrition, a condition that is prevalent across the world in hospital inpatients (~10-60% of hospital admissions are at risk of malnutrition), outpatients (~15 to 30%) and in individuals living in the community (including free-living older people aged 65 y and over), those visiting general practice, and those living in care homes and other community institutions, ~14 to 44%). In Spain, a nationwide, cross-sectional study of hospital malnutrition [PREDyCES (n 1707), using the Nutrition Risk Score] suggested that around one quarter of patients were malnourished.1 The prevalence of malnutrition was highest in older patients hospitalised for medical conditions (cancers, respiratory and cardiovascular diseases). Other studies (using a variety of screening methods) have suggested a similar or greater prevalence of malnutrition in the hospital setting.2 Malnutrition is also a problem outside of the hospital setting in Spain. Multi-centre surveys of institutionalised older people in Spain (n 493) have suggested that between a quarter and a half are malnourished/at risk of malnutrition (using MNA).3 Even in free-living elderly (living in their own homes, n 728) in Northern Spain, 12.5% were classified as malnourished and 57.5% as at risk of malnutrition with MNA.4

Disease-related malnutrition is detrimental physiologically and clinically, impairing quality of life and delaying recovery from illness.5 Data suggests disease-related malnutrition increases the risk of mortality and complications and increases the use of health care (length of hospital stay, hospital admissions, GP visits, support required after hospital discharge).5,6,15 Specifically in a nationwide Spanish survey (PREDyCES), malnourished patients had a longer length of hospital stay (by 3-4 days), a higher incidence of complications and greater hospital costs than non malnourished patients.5 Local surveys in Spain have also suggested greater healthcare use (longer hospital stays, more total and emergency admissions) in those with malnutrition (assessed using a variety of different criteria).5,5 Consequently, it is unsurprising that latest estimates suggest that malnutrition is extremely costly to societies. In the UK the expenditure on disease-related malnutrition has been estimated to be more than £13 billion (£15.63 billion; 20.03.12) annually (population ~60 million, 2007 data).17

Considering the enormous costs of disease-related malnutrition, a condition that is largely treatable, it is surprising that it is commonly under-detected and under-treated. In the community setting (including outpatients and care homes), studies in the UK and other European countries have suggested that under-detection and/or under-treatment occurs in a substantial (up to 80%) proportion of malnourished individuals.10,22 Two large surveys in the UK found that around 20% of care home residents were at high risk of malnutrition with ‘MUST’ but most (between 64 and 80%) did not receive any nutrition support. Similarly, in the hospital setting, Waitzberg et al found that < 19% of patients had any recorded nutritional information in their medical records and only a small proportion received any kind of nutrition support.23

In order to improve the identification and treatment of malnutrition prompt identification with screening, followed by the most appropriate, effective, evidence-based treatment is recommended.13,23,24

The National Institute for Health and Clinical Excellence (NICE) in the UK, recently released cost saving clinical guidance, within the top four of which was nutrition support (in the form of oral nutrition support, tube feeding and parenteral nutrition). Specifically, NICE suggested “If this guidance (CG32) was fully implemented and resulted in better nourished patients then this would lead to reduced complications such as secondary chest infections, pressure ulcers, wound abscesses and cardiac failure. Conservative estimates of reduced admissions and reduced length of stay for admitted patients, as well as reduced demand for doctor and outpatient appointments indicate that significant savings are possible”.25

A pragmatic programme of screening implementation (using ‘MUST’) in care homes in the UK highlights some such benefits.26 A programme involving education and training on malnutrition, screening and treatment using the framework of ‘MUST’, locally agreed care plans and monitoring, improved the documentation of nutritional status, the proportion of residents screened and the use of appropriate care plans. After the implementation of the screening programme, significant reductions in the number and duration of hospital admissions was observed, associated with a significant cost saving.26 Similar improvements of nutritional care and outcome have been observed in other settings where screening has been implemented. Rypkema et al showed improvements in nutritional status and fewer complications in older (> 65 y) inpatients with a multi-disciplinary intervention involving a screening programme27 and Stratton et al found an increase in documentation of nutritional information, use of care plans and shorter hospital stays in neurology wards after ‘MUST’ implementation.28 In another study, early nutritional screening and treatment of malnourished patients reduced the length of hospital stay in malnourished patients who had low handgrip strength (e.g. frail patients).29

Implementing a screening programme is an effective way of identifying those who do and do not need nutritional support. Most patients who are malnourished or at risk of malnutrition can be managed using the oral route, often with a variety of dietary approaches including dietary modification (fortification, extra snacks etc.) counselling by a dietitian and/or oral nutritional supplements (ONS).30 However, with the rise of evidence-based...
practice, there is a need to demonstrate the effectiveness of these different strategies whilst making sure that they are used appropriately and their efficacy is maximised.

Although the focus of this review is the use of ONS, it is important to note that there is little formal evidence to support many of the other strategies used in the management of malnutrition, such as food snacks, fortification and dietary counselling.\textsuperscript{23} Although the clinical and cost effectiveness of such strategies appear to be largely undocumented, they are widely advocated across health care settings in an attempt to reduce the use and costs of prescribable products. Policies that focus only on reducing costs by withholding or stopping treatments are considered unsatisfactory since they do not assess the clinical and economic consequences of this reduction and do not represent cost effectiveness.\textsuperscript{24} Malnutrition that is untreated or ineffectively treated is likely to lead to poorer quality of life, more complications, greater health care use and greater total health care expenditure.

**Oral nutritional supplements (ONS)**

Many individuals whilst acutely or chronically ill are unable to consume the energy and/or nutrients they need from food alone, for a wide variety of reasons.\textsuperscript{8} These are broadly divided into two main causes: a variety of disease-related factors and the inadequate availability and quality of food. Disease-related factors are many and include anorexia, nausea and vomiting, changes in taste and smell, painful or dry mouth, disorders of swallowing, breathlessness, difficulties in chewing, fatigue and other specific side-effects of surgery, drugs or inflammatory conditions. Disease-related psychosocial problems may also impair food intake, including depression, anxiety, social isolation, unappealing meal environments. For individuals at home, inadequate availability of food may be due to inadequate resources (finances, cooking facilities), poor access to shops or physical difficulties affecting food preparation. Within institutions, the quality, timing and presentation of food may limit intake. Oral nutritional supplements offer a useful and effective strategy when used in addition to food to meet any deficits in nutrient intake. Oral nutritional supplements are typically multi-nutrient containing a mix of macronutrients (protein, carbohydrate, fat) and micronutrients (vitamins, minerals, trace elements). Ready-made, nutritionally complete supplements are also energy dense (mostly containing 1.5 kcal [6.3 kJ]/ml to 2.4 kcal [10.1 kJ]/ml, ~300 kcal [1.26 MJ] per serving [125-220 ml] and provide a good source of protein (10-20 g per ~300 kcal [1.26 MJ] serving) and a balance of micronutrients. Most are liquids that are available ready-made and so are convenient for individuals to use at home when ill and for health care professionals to administer in busy community and hospital settings, such as care homes and hospital wards. Powder supplements (to be reconstituted with water or milk before consumption) are also available, although currently there is little evidence to support their use. The current evidence base supporting supplements is mostly for ready-made types and highlights their effectiveness for use in patients with or at risk of malnutrition, particularly older individuals, those who are acutely ill and perioperative patients.

**Evidence base for oral nutritional supplements**

A systematic review, which may or may not include a meta-analysis, has traditionally been considered as the best way of assessing the evidence base for an intervention, such as ONS (type I in the hierarchy of evidence).\textsuperscript{25} In the last decade, an increasing number of systematic reviews have been undertaken to examine the effectiveness of nutrition support strategies in the management of malnutrition. The majority of these systematic reviews have focused on the use of ONS, the strategy for which there is the greatest number of individual trials available, usually in comparison to routine care (no nutritional support).\textsuperscript{8,24} Below is a summary of the evidence available for ONS.

**Clinical outcomes and oral nutritional supplements**

Systematic reviews and meta-analyses\textsuperscript{8,24,34-36} consistently suggest that ONS produce a range of clinical benefits including reduced mortality and fewer complications, such as wound and chest infections, pressure and leg ulcers. These are described in more detail in a “review of reviews”\textsuperscript{37} and a summary of these meta-analyses is shown in table I. In most trials, the daily reported intake of ONS was typically between 250-600 kcal (1.05-2.52 MJ)/d of ONS, with one review\textsuperscript{38} suggesting that patients offered > 400 kcal (1.68 MJ)/day were more likely to benefit. The duration of supplementation varied depending on the patient group, from short periods in hospital (1 week) to much longer periods in the community (up to 2 years). The NICE (2006) review suggested that the significant reduction in mortality and other improvements in clinical outcome seen with proprietary ONS in malnourished patients could not be demonstrated for other forms of oral nutritional support (e.g. food fortification, dietary advice) due to a lack of data.\textsuperscript{39} Similarly, a Cochrane review also highlighted the lack of data on the effects of dietary advice on clinical outcomes in both community and hospital settings.\textsuperscript{31} Systematic reviews and meta-analyses have highlighted significantly reduced mortality with ONS versus routine care (table I) in patients with a range of acute and chronic conditions, especially acutely ill, older patients.\textsuperscript{24,34,35-38} The effect of ONS on mortality may vary according to the nutritional status of patients. The NICE review only considered trials in malnourished patients but both Stratton et al. 2003 and Milne et al. 2006 indicated...
<table>
<thead>
<tr>
<th>Systematic review</th>
<th>Intervention vs. routine care</th>
<th>Mortality*</th>
<th>Complication*</th>
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| Stratton et al., 2003<sup>3</sup>  
(Studies in a wider range of patient groups, hospital and community settings) | Mostly multi-nutrient, liquid ONS, 250-600 kcal (1.05-2.52 MJ)/day for < 1 week to 2 years | OR 0.62 (95% CI 0.49-0.76), 17 RCT, n 2096 | OR 0.29 (95% CI 0.18-0.47), 10 RCT, n 494 |
| NICE 2006<sup>24</sup>  
(Studies in malnourished patients with a wide range of conditions in hospital and community settings) | Multi-nutrient proprietary ONS | RR 0.81 (95% CI 0.68-0.97), 18 RCT, n 2564 | RR 0.71 (95% CI 0.61-0.82), 7 RCT, n 1001 |
| Milne et al., 2006<sup>36</sup>  
(All studies with a mean age > 65 y, individuals with a wider range of conditions) | Mostly multi-nutrient, liquid ONS, some powders, 175-1,000 kcal (0.74-4.2 MJ)/day for 10 d to 18 months | OR 0.86 (95% CI 0.74-1.00), 25 RCT, n 6852 | OR 0.82 (95% CI 0.65-1.03), 19 RCT, n 5508 |
| Stratton et al., 2005<sup>34</sup>  
(Studies in all patients at risk of developing pressure ulcers, hospital and community settings) | All multi-nutrient, liquid ONS, mostly high protein, 250-600 kcal (1.05-2.52 MJ)/day for 2 to 26 weeks | – | OR 0.79 (95% CI 0.62-0.89)**, 4 RCT, n 1224 |
| Koretz et al., 2007<sup>38</sup>  
(Studies in geriatrics and in perioperative patients – variety of conditions and both hospital and community settings) | Mostly multi-nutrient, liquid ONS | Geriatrics<sup>+</sup> -4% (95% CI -7% to -1%), 14 RCT, n 1733 | Geriatrics<sup>+</sup> Infectious complications only -5% (95% CI -13% to 3%), 3 RCT, n 503 |

* An odds ratio or relative risk below one indicates a lower incidence of mortality or complications in the supplemented patients than control patients. If the confidence interval does not pass 1.00, the result is statistically significant.

** In this meta-analysis the only complication assessed was pressure ulcers. In all other trials, a variety of complications were assessed (including wound infections, chest infections, pressure ulcers etc.).

*** Added since publication of the “review of reviews”.</ref>.

OR: Odds ratio; RR: Relative risk; CI: Confidence interval; Data presented as absolute risk difference.
that ONS were more likely to reduce mortality in underweight/undernourished patients. Irrespective of nutritional status, the strongest and most consistent evidence for an effect of ONS on mortality is in older people and in the acutely ill, where mortality is highest. There was little evidence of an effect of ONS on mortality in free living individuals, where mortality rates are low. Studies with very large sample sizes and a prolonged duration of supplementation are needed to examine the existence of such effects as sufficiently powered trials are lacking. The effect of ONS on mortality may also vary depending on the composition of the supplement used. It appears that the existing evidence is mostly for multi-nutrient, liquid ONS that have < 20% energy from protein, as reductions in mortality were not found in a meta-analysis of high protein ONS. Overall, there is a need to undertake high quality studies to obtain a better understanding of the mechanisms by which different types of ONS influence patient outcomes such as mortality, which may enable a more targeted use of ONS (timing, ONS quantity and type, duration) in specific health care settings and patient types. Although the methodology of individual trials (assessed in all reviews) was often judged to be poor, usually due to lack of blinding, the effect of bias on unambiguous outcome measures, such as mortality, may be limited.

Systematic reviews of trials across different patient groups have highlighted substantial reductions in a range of complications with ONS, including infections (wound, chest, urinary etc.), incomplete wound healing, pressure ulcers and total complications (see table I for meta-analysis results). One systematic review showed a significant reduction in the development of one specific complication (pressure ulcers) with ONS versus routine care (OR 0.75 (95% CI 0.62-0.89), 4 RCT, n 1224) (table 1). In this meta-analysis, most studies used a liquid, high protein ONS for between 2 and 26 weeks, across hospital and long term care. The other systematic reviews and meta-analyses mostly reported significant reductions in a range of complications with ONS use in hospital, community or combinations of health care settings. In most cases liquid, ready-made, multi-nutrient ONS were used, with reported intakes of 250-600 kcal (1.05-2.52 MJ)/d. In a recent systematic review including only high protein ONS (containing > 20% energy from protein), reductions in complications were also observed (OR 0.68 (95% CI 0.55-0.83), p < 0.001). In hip fracture patients, a Cochrane review suggested that protein-containing ONS reduced unfavourable outcome (mortality or complications) compared with non-protein containing ONS.

Systematic reviews of trials in patients in the perioperative period have also indicated fewer complications with ONS use before, during and after hospitalisation, including total complications, infectious complications, major complications and intra-abdominal/thoracic complications. The reduction in complications with ONS does not appear to differ between studies in which the mean body mass index is < 20 from those in which it is > 20 kg/m². Indeed, reductions in complications are observed in surgical patients [e.g. gastrointestinal (GI) surgery], who are not obviously thin but in whom poor nutritional intake in the post-operative period may have contributed to the development of complications.

Functional outcomes and oral nutritional supplements

Due to the wide range of functional outcomes measured in trials of ONS across different patient groups, it can be difficult to synthesise the evidence into a single meta-analysis of randomised, controlled trials. One systematic review that considered the impact of ONS on function in detail was Stratton et al 2003. Within this systematic review, a number of individual studies in both hospital and community patients were found to show significant improvements in functional measures with ONS in groups such as older people, patients with liver disease and those undergoing surgery. The functional improvements included muscle strength, quality of life, immune function, walking distances and activities of daily living. This review also reported that in chronically ill patients in the community, functional benefits were more likely to occur in underweight individuals (BMI < 20 kg/m²) who gained weight (> 2 kg) with ONS. A recent systematic review and meta-analysis of studies in patients with COPD has also shown an association between improvements in energy intake and body weight with nutritional support (primarily with ONS) and functional outcomes (hand grip strength and respiratory muscle strength). Significant improvements in skeletal muscle strength were also observed in a meta-analysis of high protein ONS. Further research is warranted to determine the effects of ONS on important functional measures, such as performance status and quality of life.

Nutritional outcomes and oral nutritional supplements

Nutritional status

Systematic reviews and meta-analyses that assess nutritional status consistently indicate significant improvements with ONS. The most common indicator of nutritional status assessed has been body weight. All meta-analyses that examined this outcome appeared to report a significant improvement with ONS relative to routine care in all settings (hospital, long term care, community). Milne et al’s meta-analyses indicated significant improvements in percent weight change with ONS relative to routine care in older patients in long term care (weighted mean difference (WMD) 2.51 (95% CI 1.73-3.20 %), in the community (2.25 (95% CI 1.72-2.70 %) and in hospital (1.75 (95% CI 1.12-2.30 %)
with a wide range of conditions, although it was unclear if they were malnourished or not. Another meta-analysis indicated a significant improvement in weight with ONS relative to dietary advice (WMD 1.09 (95% CI 0.29-1.90) kg). In general, ONS use aided weight gain in chronically ill patients in the community setting and attenuated weight loss in studies in acutely ill patients in hospital. Improvements in weight with ONS were seen more frequently in community trials in which the mean BMI was < 20 kg/m² (vs. > 20 kg/m²), but it was not possible to analyse the impact of ONS on patients who were weight losing, irrespective of BMI. The composition of weight gain achieved with ONS (e.g. lean tissue, fat mass) was either not assessed or unclear in many studies, although a few RCT indicated significant improvements in lean tissue or body fat. In most trials, upper arm anthropometry was used, possibly as an easier and more practical method to use clinically than other more sophisticated body composition techniques.

Milne et al’s review showed a significant increase in mid arm muscle circumference with ONS use in older hospital patients (WMD 1.41% (95% CI 0.46-2.35%); 6 RCT). Irrespective of the composition of weight change, the increases in weight observed with ONS were linked to functional benefits, particularly in older people and in patients with COPD. In studies in the acute setting, improvements in clinical outcome were often associated with very small changes in body weight (< 1-2 kg) as the periods of supplementation were sometimes as little as one week. It is possible that the improvements in outcome observed with ONS, particularly in the acutely ill, occur via mechanisms that are largely independent of changes in body mass. One or more nutrients (macro- or micronutrients) provided by liquid, multi-nutrient ONS, could influence immune/inflammatory responses, and hence clinical outcome irrespective of changes in body weight or lean tissue mass.

Nutritional intake

Systematic reviews that address the impact of ONS on nutritional intake consistently show improvements in total energy intakes in acutely and chronically ill patients in hospital and community settings. Some indicate significant improvements in the intakes of protein and micronutrients. Although often not assessed in trials, it is likely that total nutrient intakes (including micronutrient intakes) are improved with ONS. This is partly because liquid supplements contain a range of macro- and micro-nutrients and also because liquid ONS do not appear to substantially suppress voluntary food intake or appetite. This may be particularly important in older patients and those suffering with anorexia, in who liquid ONS have been shown to improve energy, protein and micronutrient intakes to a greater degree than isoenergetic food snacks in both the hospital and community environment. Similarly, the Cochrane review of Baldwin et al found significantly greater energy intakes were achieved with ONS than dietary advice (WMD 91 (95% CI 23-159) kcal) (0.38 MJ (0.10-0.67 MJ)), 4 RCT (n 138). See for a more detailed review.

Health care use and costs with oral nutritional supplements

There has been an increasing interest in the effects of ONS on health care use and costs. In the acute setting, reductions in length of hospital stay and complications and a reduction in associated costs with ONS have been well documented. BAPEN’s health economic report found that the average net cost saving associated with ONS use in specific groups of hospitalised patients was £ 850 (1022 (20.03.2012) per patient (2003 prices) and concluded that “Oral nutritional supplements can produce a net cost saving and be cost effective in selected patient groups (such as patients undergoing gastrointestinal or orthopaedic surgery)”. The evidence base for the use of nutritional support (ONS and tube feeding) to prevent pressure ulcers has been systematically examined. This review found that nutritional support had important clinical and statistically significant effects on reducing the development of pressure ulcers in at risk populations. Based on this systematic review, a simple cost analysis indicated reduction in costs with the use of ONS to prevent pressure ulcers. For all stages of pressure ulcers, there was a net cost saving in favour of ONS, which was significant for stage III (effect size 0.12 (95% CI 0.00, 0.11; p = 0.04) and stage IV ulcers (0.12 (0.01, 0.11; p = 0.04). This corresponded to a net cost saving of £ 5 (6 (stage I) to £ 460 (553 per patient (stage IV) (2004 prices, £ to € conversion 20.03.12).

Hospital admissions/readmissions

Studies are now starting to assess the effects of ONS use, either entirely in the community or partly in the community following initiation in hospitals, on hospital admissions and readmissions. Recently, two large randomised, controlled trials have highlighted significant reductions in the proportion of patients readmitted to hospital following the use of high protein ONS in community settings, in older people with a wide range of conditions and in individuals with benign GI disease (fig. 1). As part of a recent systematic review of studies of high protein ONS, meta-analysis showed a significant reduction in hospital readmissions [odds ratio 0.59 (95% CI 0.41 to 0.84), p = 0.004, n = 546)]. Other trials using other types of ONS have also suggested fewer admissions/readmissions in malnourished individuals receiving ONS (fig. 1), although a systematic review and meta-analysis of all such data is required. The potential cost savings associated with such reduction in health care use are important, as well as the associated improvements to patients’ quality of life that may result.
Encouraging appropriate use and maximising compliance

Oral nutritional supplements, like any type of treatment, need to be used appropriately, and as effectively as possible. Nutrition support should be tailored to the individual as much as is feasible and an individual’s preference for the type of treatment they require should be taken into account, including the type of supplement they prefer, the time and way in which they receive and consume it (or other interventions that they may prefer). Of course encouraging compliance to supplements is vital if improvements in nutritional intake and outcomes are required. Maximising the acceptability of supplements to patients may include using a variety of flavours, textures, temperatures, serving formats and consistencies. However, other patients are happy consuming the same supplement (type and flavour) for long periods of time. The energy density, volume and macronutrient profile of the supplement, the time and way it is administered and the duration of supplementation are all factors that may affect compliance.8,57

Recently, studies have suggested that increasing the energy density of liquid feeds improves both nutritional intake and compliance with supplementation, over the use of standard energy dense feeds in hospital and community patients.58-60 Increasing the energy density of ONS minimises the volume needed to be consumed by a malnourished patient, and so encourages compliance and nutritional intake.58-60 These findings have been confirmed by a systematic review of 46 studies (n 2,282 patients on ONS).61 This review found a significant positive relationship between compliance and the energy density of ONS. Compliance with ONS with energy density ≥ 2 kcal/ml was significantly higher than lower energy density supplements (fig. 2). It is also likely that encouragement and education about the reasons for taking supplements will be beneficial. Overall, greater understanding is still needed to maximise compliance with supplementation, especially over long periods of time, so that benefits can be achieved and sustained.

Like other treatments in clinical practice, it is recommended that the use of ONS (and other forms of nutritional support, such as dietary counselling) is appropriate and monitored. This typically involves reviewing the indications for the use of ONS, setting appropriate goals at the onset and reviewing these goals at intervals (the goals may include improvements in nutritional intake, weight and clinical/functional outcomes). The optimal dose and timing of supplementation for a patient is also important and should be reviewed regularly. It is necessary to review whether termination of ONS is needed and whether the addition of other forms of nutritional support is needed such as enteral tube feeding and/or parenteral nutrition where clinically indicated.

Summary

Appropriate, evidence-based use of oral nutritional supplements should be an essential part of the management of disease-related malnutrition, particularly in the current economic environment we are facing. Malnutri-
tion needs to be identified and treated effectively since failure to do so can lead to disease complications and delay recovery from illness, at enormous cost to the healthcare and social services. Prompt identification and treatment is required to attenuate the detrimental impact of malnutrition on health and quality of life. The appropriate use of ONS should be an integral part of the management of disease-related malnutrition, particularly as ONS (mainly ready-made, multi-nutrient ONS) are the only form of oral nutritional support with a substantial evidence-base. The evidence from systematic reviews and meta-analyses supports the use of ONS in a wide variety of conditions but the evidence is strongest in the acutely ill, in older patients and in malnourished patients, in whom a range of clinical benefits, including a significant reduction in mortality and complications, such as infections and pressure ulcers, have been demonstrated. Appropriate use of ONS is likely to lead to economic benefits associated with reduced health care use, including a reduction in the number of hospital admissions and duration of hospital stay.

References


![Fig. 2.—Compliance according to ONS energy density](image-url)


