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Symposium 3 (Jointly with the British Dietetic Association): Nutrition management in special populations
Improving the dietary intake of frail older people

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As a population subgroup, older people are more vulnerable to malnutrition especially those who are institutionalised. Recognition of deteriorating or poor nutritional status is key in reversing the effects of undernutrition and reinforces the value of regular weight checks and/or the use of screening tools. Commercially produced supplements are often the first option used to address undernutrition in both acute and community settings. They can be expensive and, although regularly prescribed, have undergone only limited evaluation of their effectiveness in community settings. An alternative but less researched approach to improve the nutritional status of undernourished people is food fortification. This approach may be particularly useful for older people, given their often small appetites. The ability to eat independently has been significantly related to decreased risk of undernutrition. Assisting people who have difficulty feeding themselves independently should become a designated duty and may be crucial in optimising nutritional status. Lack of nutrition knowledge has been identified as the greatest barrier to the provision of good nutritional care. Education and training of care staff are pivotal for the success of any intervention to address undernutrition. The development of undernutrition is a multi-factorial process and a package of approaches may be required to prevent or treat undernutrition. Nutrition must be at the forefront of care if national care standards are to be met.

Older people: Undernutrition: Food supplementation

The older population is increasing worldwide; population figures for the UK suggest that the number of people of pensionable age will increase from 11 million in 2006 to about 15 million by the year 2031[1]. As a population subgroup, older people are more vulnerable to malnutrition and this, rather than overnutrition is the main cause for concern, as it is associated with an increased risk of morbidity and mortality[2].

Many individual factors contribute to the development of malnutrition among older people. These have been categorised as physical or those associated with an individuals' social environment such as institutionalisation[3]. Recent studies have shown that while the prevalence of undernutrition in the free-living older population is low, the risk of undernutrition increases in institutionalised older adults[3,4]. In the UK about 16% of older people in care have been found to be undernourished[4,5]. Within institutions several organisational factors have been highlighted as contributing to the development of malnutrition[3] (Table 1).

Identification of undernutrition

Identifying those at risk of undernutrition is a crucial first step in improving nutritional status. Many nutrition screening tools are available to help identify adults who are undernourished or at risk of becoming so. The most widely used in the UK is the Malnutrition Universal Screening Tool. Developed for use in the UK, it is a clinically validated short five-step screening tool that

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Table 1. Organisational factors causing malnutrition[3]

Organisational factors	
Failure to help patients to eat	Leaving residents in bed all day
Failure to recognise malnutrition	Inadequate training and education of staff
Lack of screening	Monotonous unappetising diet
Importance of nutrition not realised, treatment too late	Soft diet regimen (as opposed to ensuring dentures fit)
Absence of dietitian	Inappropriate drug prescribing
Lack of staff	Insufficient data collection
Lack of communication between staff	Lack of enforcement of regulations

includes guidelines to help formulate a care plan. The Malnutrition Universal Screening Tool is supported by key UK professional organisations whose remittance includes addressing undernutrition[6]. Many other tools are available which have also been validated for use in the elderly, some of which have been reviewed[7].

Despite the availability of screening tools nutritional screening is often not undertaken and undernutrition is overlooked. One study[5] undertaken to determine the prevalence of undernutrition in residential care homes found 17% of the thirty-five residents in one home had a BMI $<18.5\,kg/m^2$. Only two of these residents were receiving any form of nutritional support with undernutrition undetected and untreated in the majority of cases. A similar picture can be found elsewhere[8,9]. Researchers identified over 50% of 1043 patients in long-term elderly care wards in Finnish hospitals to be undernourished. However, nurses only considered about 15% to be undernourished with only one in six receiving nutrition support[8]. Thirteen percent of admissions (219) to a large inner city hospital, over a 4-week period, were identified by researchers as malnourished[9]. However, subsequent review of medical notes after discharge found that 75% had not been identified by health-care staff and this included 70% with a BMI $<18.5\,kg/m^2$. In Scotland, a recent Care Commission report[10] found that around one-third of the homes inspected did not have any form of nutritional screening.

Recognition of deteriorating or poor nutritional status is key to reversing the effects of undernutrition and reinforces the value of regular weight checks and/or the use of screening tools. This would allow action to be taken before serious illness develops as a result of poor nutritional status. Identification of individuals who are undernourished or at risk of becoming undernourished must lead to appropriate action. A recent report highlights that less than optimal nutritional care can result from a lack of clarity regarding who is responsible for doing what, no clear plan for meeting, eating and drinking requirements and lack of clear advice on how to deal with nutritional problems[10]. It is essential that clear procedures on how nutritional care should be delivered to those identified as undernourished are provided. The National Institute for Health and Clinical Excellence (NICE) guideline on managing undernutrition provides this[11].

Dietary approaches to address undernutrition in older adults

The provision of commercially available supplements is one approach advocated by NICE[11]. These are widely available and provide all macronutrients, usually supplemented with micronutrients, and are offered most frequently as sweet drinks. Their short-term effectiveness in a hospital setting and on discharge has been evaluated with supplementation studies showing mixed effects on body weight[12–15]. A systematic review by Potter *et al.*[16] quantified the effects on body weight as $+2.06\%$ (95% CI 1.63, 2.49)[13]. A more recent Cochrane Review [17] found the use of oral supplements, mainly in a hospital setting, produced a small but consistent weight gain of about 2.2% (1.2 kg for a person of 55 kg) in older people. Sub group analysis showed evidence of reductions in mortality in those who were undernourished (relative risk 0.79 (95% CI 0.64, 0.97)).

The meta-analysis carried out by NICE [11] also concluded that while the studies included in the review were small, they showed that that the use of oral nutritional supplements in malnourished patients led to statistically significant improvements in body weight (1.26 kg, 95% CI 0.79, 1.74) along with reductions in complications and mortality. Few studies included in the review were outwith a hospital setting and caution was advocated when extrapolating the results to a community setting.

Food fortification

Taste intolerance is known to limit the use and effectiveness of oral nutritional supplements and can raise attrition rates from studies to 25% after 2 weeks[13]. An alternative approach to improve nutritional status, also recommended by NICE, is food fortification: increasing the energy density of existing meals by adding energy-rich foods. This method may be particularly useful for older people, given their often small appetites. It is a less well-researched area and studies examining this approach have had variable results. In one study[18] patients in one ward of a nursing home, not all of whom were undernourished, had their food fortified over a 15-week period. A high proportion of patients in the study had dementia. In comparison with baseline, energy intake was increased significantly in the food fortification group ($+504\,kcal$ (2109 kJ), $P<0.001$) and was significantly higher than in the control group who were served a standard diet ($P<0.01$). The greatest effects on energy intake were seen in subjects with a lower BMI ($<24\,kg/m^2$). Increases in energy intake were not, however, matched by improvements in body weight, except for those with a lower BMI in whom a trend towards weight gain was reported. Functional status remained stable in intervention subjects but decreased significantly in control subjects ($P<0.001$). The hypothesis of this study was that

food fortification would improve energy intake and improve patients' abilities to perform the activities of daily living. The overall lack of effect on body weight may be a result of few, if any, of the patients being undernourished. Achieving improvements in functional status may require multi-factorial interventions that also address physical and cognitive factors[19].

In a more recent study, again carried out in a nursing home setting, a 12-week intervention of a protein and energy-enriched diet plus snacks was evaluated to determine its effects on nutrition and functional status in residents at risk of malnutrition[20]. Sixty-five residents (sixty-two at risk, three malnourished) participated. At week 12, protein intake was significantly higher ($P = 0.007$) in the intervention group but total energy intake was similar in both intervention and controls. Significant improvements in body weight ($P = 0.001$) and BMI ($P = 0.007$) were seen in the intervention group but no change in functional status was observed. Between-group differences were not significant due to similar improvements in these measures in the control group. This, the authors suggest, was most likely due to increased awareness in those caring for the control group. They also suggest that the satiating effect of protein-enriched snacks may have prevented increases in total energy intake in the intervention group. However, baseline dietary intakes were not recorded and therefore it is not possible to determine the changes from baseline in energy intake in either group.

The effect of food fortification on dietary intake and nutritional status in residential care home residents identified as undernourished (BMI $<18.5 \text{ kg/m}^2$), was investigated in a randomised controlled study[21]. In homes allocated to the 12-week intervention (nine homes, twenty-two participants), the researchers aimed at increasing energy intake by 400 kcal/d (1674 kJ/d) using butter, cream and a milky drink made with full-fat milk. Homes allocated to control (nine homes, nineteen participants) continued with usual care and food provision. Assessment of dietary intakes was carried out at baseline and week 12 using 3-d weighed intake diaries. The mean increase in energy intake in intervention subjects was not significant ($+133$ (SEM 89) kcal (556 (SEM 372) kJ), $P = 0.15$). Mean energy intake fell in control subjects but this change was not significant and between-group analyses showed no significant difference in the changes in energy intake. However, despite the non-significant increase in energy intake a significant increase in body weight was observed in intervention subjects ($+1.3$ (SEM 0.53) kg, $P = 0.03$). At the end of the intervention, the BMI of six of the residents allocated to the intervention was 18.5 kg/m^2 or above and they were therefore no longer considered undernourished using WHO criteria[22].

The significant within-group improvements seen in these studies suggest a benefit of food fortification. Greater effects on energy intake and body weight may be achieved if interventions are continued over a longer period of time. Compared to using commercially prepared sip feeds, food enrichment may be less expensive, without taste fatigue, and allow the retention of and continued enjoyment of habitual eating patterns.

Feeding assistance

The ability to eat independently has been significantly related to decreased risk of undernutrition[23]. While meal provision may be adequate, if meals are put out of reach or people have difficulties with feeding themselves, nutritional status can be compromised[24].

The effects of providing assistance with feeding on dietary intake and body weight were examined in a cross-over controlled trial of seventy-six long-term nursing home residents at risk of unintentional weight loss[25]. Residents were given help with meals and snacks by research staff twice daily, over a 6-month period. Food provision was unchanged. Significant improvements in dietary intake were seen in the intervention group resulting in weight maintenance or weight gain for more than 50% of subjects. This was in contrast to the control group where dietary intake remained stable and greater proportion of subjects lost weight (24% v. 16%). This intervention was administered by research staff and the authors acknowledged that it may be difficult for nursing homes to implement the intervention with the same intensity as part of routine care.

This approach, however, was less effective in an acute hospital setting[26]. In this randomised controlled trial, health-care assistants who were given specific training, identified patients at nutritional risk, planned care and provided assistance with feeding. The primary outcome measure was infection rate/antibiotic use, but changes in body weight were also examined. The intervention significantly reduced the use of antibiotics in the intervention group ($P = 0.02$); however, it failed to prevent weight loss. The median duration of the intervention was short at 16 d, which may have been too short a duration for any improvements in nutritional or functional status to be seen. The study highlights the difficulties in improving and preserving nutritional status in older acutely ill people and suggests that this particular population may need more nutritional support than just feeding assistance alone. However, regardless of the setting, assisting people who have difficulty feeding themselves independently should become a designated duty as this may be crucial in optimising their nutritional status.

Meal style and environment

It has been suggested that mealtimes are not prioritised or 'protected' by care givers with more attention given to other work-related issues[27]. Attention has also been drawn to the physical environment in which meals are taken and it is thought that both these factors can influence food intake and nutritional status.

A family style approach to mealtimes was shown to improve body weight, quality of life and well-being, as well as providing social contact in nursing home residents[28]. In this study, carried out over a 6-month period, meals were taken in a pleasant communal setting, with staff sitting with residents to provide assistance. Residents had a choice of food and could serve themselves in the proportions they preferred. No other activities were undertaken during mealtimes. Residents allocated to control continued to receive the usual pre-plated meal service

in which meals were chosen 2 weeks in advance. Meals were eaten in a dining room with no added table dressings and although staff were present they continued with other duties over the meal period. Significant between-group differences were seen in quality of life (6·1 (95 % CI 2·1, 10·3) units), fine motor function (1·8 (95 % CI 0·6, 3·0) units) and body weight (1·5 (95 % CI 0·6, 2·4) kg). These findings mirror those of an earlier smaller study of longer duration (1 year)[29]. Improvements in body weight and a stabilisation of health status were observed in nursing home residents who were served their meals using a similar family style approach.

This approach has also been tested in an acute hospital setting[30]. Patients in acute care of the elderly wards allocated to the intervention were encouraged to take their meals in a dining room that was attended by a trained nursing assistant whose designated duty was to give encouragement and support as required. Patients in wards allocated to control took their meals by the bedside and nursing assistants were only available as part of the normal ward routine. Energy intake was significantly improved in those taking meals in the dining room in comparison with controls (489 v. 360 kcal (2045 v. 1506 kJ), P<0·013). While this did not result in between-group differences in weight gain (P = 0·6), a trend towards weight gain was observed in the intervention group. This study was of a short duration, only 6 weeks, and greater effects on weight may have resulted from a longer intervention period.

All three studies implemented interventions with several components and it would be difficult to ascertain which component had most effect. However, common to all was the availability of or provision of feeding assistance. Protected mealtimes is one of the ten key characteristics of good nutritional care[24]; an integral part of protected mealtimes is the provision of assistance with meals.

Nutrition knowledge

Many who care for older people are unqualified with no health or nutritional qualifications[3]. Lack of staff training has been identified as a contributory factor in the development of undernutrition[3,31]. Research carried out among Scandinavian health professionals found that lack of nutrition knowledge was the greatest barrier to the provision of good nutritional care[32].

One study investigated the effects of a short (12 h) compulsory education programme on the nutritional status of residents in sheltered accommodation[33]. About 16 % of residents had a BMI <20 kg/m^2. Nutrition knowledge of staff was assessed by questionnaire at baseline and 5 months later. The questionnaire included a vignette of a fictitious patient and respondents were asked to suggest nutritional measures to address the patient's eating and weight loss problems. Results showed that while nutrition knowledge of staff improved following the training programme, no improvements in the objective measurements of nutritional status (weight, BMI) of residents were seen at 5-month follow-up.

A more in-depth education programme delivered at monthly intervals over a 6-month period to staff in nursing homes caring for patients with dementia produced more encouraging results[34]. The programme was based on constructive learning theory with staff implementing what they learned in sessions with residents in their care. This included nutrition screening, recording of food diaries, making changes to diet by enriching foods. The intervention improved both nutrition knowledge of carers and nutritional status of patients. Pre- and post-education comparison of resident's energy intake showed significant improvement (P<0·005), with improvements in nutritional status also observed as assessed by the Mini Nutritional Assessment tool.

A recent report by the Council of Europe[35] has recommended that continuing education programmes should be implemented for care home staff. However, these studies suggest that the provision of education alone is not effective and a more robust programme including education, practice and continuous evaluation that links education to care is needed to improve nutritional status. Attention needs to be given to education and training of staff, with recognition that undernutrition impairs quality of life, and that identification of undernutrition incurs a need for increased staff input and some costs.

Conclusions

Undernutrition is described as 'a silent or unrecognised problem which substantially decreases quality of life and increases morbidity'[31]. An estimate of the cost of disease related undernutrition in the UK in 2003 was >£7·3 million per annum. Around half of this cost is incurred in long-term residential care[36]. The development of undernutrition is a multi-factorial process and it is likely that in many situations, addressing one factor alone will be insufficient to prevent or treat undernutrition and a package of care may be required. Education and training of care staff is pivotal for the success of any interventions to address undernutrition. However, the nature of the work force in care-homes presents challenges to education, practice development and maintenance of skills as job turnover is high[37]. Despite increased awareness of the prevalence of undernutrition, there is concern over the continuing high number of complaints about eating, drinking and nutrition[10]. In the UK, as elsewhere, nutritional care is recognised as an important component of care and forms part of the National Care Home Standards for older people in care[38,39]. Nutrition needs to be at the forefront of care if national care standards are to be met and quality of life maximised in this sector of the population who are at increased nutritional risk.

Acknowledgements

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