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Review

Effectiveness of mealtime interventions on nutritional outcomes for the elderly living in residential care: A systematic review and meta-analysis

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ABSTRACT

The need to improve the nutrition of the elderly living in long term care has long been recognised, but how this can best be achieved, and whether (and which) intervention is successful in reducing morbidity is less well understood. The aim of this systematic review was to determine the effectiveness of mealtime interventions for the elderly living in residential care. Mealtime interventions were considered as those that aimed to change/improve the mealtime routine, practice, experience or environment. Following comprehensive searches, review and appraisal, 37 articles were included. Inadequate reporting in over half of the articles limited data quality appraisal. Mealtime interventions were categorised into five types: changes to food service, food improvement, dining environment alteration, staff training and feeding assistance. Meta-analysis found inconsistent evidence of effects on body weight of changes to food service (0.5 kg; 95% CI: −1.1 to 2.2; $p = 0.51$), food improvement interventions (0.4 kg; 95% CI: −0.8 to 1.7; $p = 0.50$) or alterations to dining environment (1.5 kg; 95% CI: −0.7 to 2.8; $p = 0.23$). Findings from observational studies within these intervention types were mixed, but generally positive. Observational studies also found positive effects on food/caloric intake across all intervention types, though meta-analyses of randomised studies showed little evidence of any effects on food/caloric intake in food improvement studies (−5 kcal; 95% CI: −36 to 26; $p = 0.74$). There was some evidence of an effect on daily energy intakes within dining environment studies (181 kcal/day, 95% CI: −5 to 367, $p = 0.06$). The need to improve the nutrition of the elderly living in residential long term care is well recognised. This review found some evidence that simple intervention around various aspects of mealtime practices and the mealtime environment can result in favourable nutritional outcomes. Further large scale pragmatic trials, however, are still required to establish full efficacy of such interventions.

1. Introduction

Malnutrition is one of the greatest threats to the health, well-being and autonomy of older adults (di Francesco et al., 2007), particularly those living in care homes. In 2010 in the UK, 37% of those admitted to a care home within the previous six months were found to be at risk of malnutrition (Russell and Elia, 2011). Studies across Europe have found the prevalence of under-nutrition within long term care units varies from 36% to 85% (Salva et al., 2009; Nieuwenhuizen et al., 2010). Elderly individuals identified as at risk of malnutrition have poorer quality of life, are more likely to be admitted to hospital, and are at increased risk of mortality (Leslie, 2011; Merrell et al., 2012; Rasheed and Woods, 2013).

Whilst the need to improve the nutrition of the elderly living in long term care has long been recognised (Department of Health, 2007; Arvanitakis et al., 2009; Nieuwenhuizen et al., 2010), how this can best be achieved, and whether (and which) intervention is successful in reducing morbidity is less well understood. Routine screening of malnutrition and appropriate and individualised nutritional care plans are mandated for every elderly resident in care (Care Commission, 2009; National Collaborating

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Centre for Acute Care, 2006), but unfortunately it appears that it is often not undertaken and under-nutrition is overlooked (Leslie, 2011; Merrell et al., 2012; Leach et al., 2013). The question therefore remains as to whether there are more general interventions that can help improve their nutrition and overall health. A 2009 Cochrane review (Milne et al., 2009) examined the effects of providing extra protein and energy, usually in sip-feed form, in elderly people at risk from malnutrition in hospitals, care settings and the community. The review found that oral nutrition supplements produced a small weight gain in older people, and a possibility of reduction of complications, but did not result in functional improvement or reductions (for inpatients) in hospital stay. A more recent, non-systematic review of oral nutritional interventions in older nursing home residents found some evidence for a positive effect on functional status through improved weight gain (Beck et al., 2011), although conclusions were limited due to small sample sizes. However, neither of these reviews included research on the broader aspects of mealtimes such as feeding assistance, food choice and access, or the aesthetics of the eating environment, all of which are known to be important considerations for elderly people (Leslie, 2011). Age-related declines in taste and smell, along with increased satiation, also impact on practical considerations for mealtimes (Nieuwenhuizen et al., 2010). Indeed it is recognised that mealtimes are 'the highlight of the day' for many people in residential care (National Collaborating Centre for Acute Care, 2006) and both 'enjoying food and being able to eat food' are part of the UK Government's nutrition care plan (2007). Indeed, some studies have suggested that improved availability of food (Lorefalt and Wilhelmsson, 2012) and family style mealtimes (Charras and Fremontier, 2010) are able to improve food intake of residents in institutionalised care. To our knowledge however, there has been no systematic synthesis of research in this area.

The aim of this systematic review therefore was to determine the effectiveness of mealtime interventions for the elderly living in residential care, and where possible, determine which types of mealtime intervention were more effective. Mealtime interventions were considered as those that aimed to change/improve the mealtime routine, practice, experience or environment. Interventions that simply used oral nutritional supplements, such as commercial sip feeds, or those that fortified food, were not included in the review.

2. Methods

The systematic review was conducted following the general principles published by the NHS Centre for Reviews and Dissemination (Centre for Reviews and Dissemination, 2009). The protocol for this review was developed in consultation with an expert in geriatrics (see http://clahrc-peninsula.nihr.ac.uk/a-systematic-review-of-the-effectiveness-of-mealtime-interventions-in-elderly-people-living-in-resid.php) and is also registered with Prospero (registration number CRD42012002755).

2.1. Types of studies

Studies of the following design were included: (cluster) randomised controlled trials (RCTs), non-RCTs, studies with before and after designs, including time-series studies, and case-control studies. Case studies and those without enough information for replication or quality appraisal were excluded.

2.2. Types of participants

The intervention had to take place in residential nursing homes or care homes. Residents needed to be aged 65 years and older. Studies that were conducted in a hospital or palliative care setting or in an individual's home within the community were excluded. Studies that included residents with specific eating difficulties, such as dysphagia, were excluded.

2.3. Types of interventions

Mealtime interventions were considered as those which aimed to improve the mealtime routine, experience or environment. Interventions were included if they directly or indirectly provided: assistance and encouragement with eating, a more stimulating environment to eat, increased access to food, more choice of food or more appealing (visual, sensory) food. Nutrition education or training interventions that were specific to mealtime care for residential elderly were also included. Interventions that investigated the use of oral nutritional supplementation such as commercial sip feeds, or vitamin and mineral supplements were excluded. Interventions that assessed fortification of food with protein or energy were also excluded.

2.4. Types of outcome measures

There is no agreement on how best to measure nutrition status. Malnutrition develops as a continuum, starting with poor food intake, followed by biochemical, body composition and physiological changes (Woods et al., 2009). Thus in many studies, a combination of measures to assess nutrition status is often employed. For this review, studies had to report on at least one nutritional outcome. Nutritional outcomes were either those directly related to food intake (energy intake, macronutrient intake, percentage food intake) or those used in clinical practice to assess nutritional status: nutritional status assessment tool (e.g. Mini Nutritional Assessment [MNA] tool) weight, weight status (e.g. BMI), body composition (e.g. mid-upper arm circumference, lean body mass), biochemical indices (e.g. serum haemoglobin, albumin), and functional status (e.g. hand-grip). Data on dietary satisfaction and quality of life, where measured, were also outcomes of interest.

2.5. Search strategy

The search strategy was developed by an information specialist in consultation with topic and methods experts. The strategy used a combination of MeSH terms and free text terms. An illustration of the search strategy used on MEDLINE can be seen in Fig. 1. Fifteen databases were searched from inception to August 2012: MEDLINE, PsycINFO, Embase, HMIC, AMED (OvidSp); CDSR, CENTRAL, DARE (Cochrane Library); CINAHL (EBSCOhost); British Nursing Index (NHS Evidence); ASSIA (ProQuest); Social Science Citation Index (Web of Science); EThOS (British Library); Social Care Online and OpenGrey. No date or language restrictions were used. Forward and backward citation chasing of each included article was conducted as well as hand searching of key journals (Journal of Nutrition Health and Ageing 2008–2012, Journal of Clinical Nursing 1992–2012, Journal of the American Dietetic Association 1993–2012, Journal of Gerontological Nursing 2006–2012 and Journal of Gerontology 1996–2012). Two reviewers (RA and RW) independently screened titles, abstracts and full texts using the eligibility criteria. Discrepancies were discussed and resolved by a third reviewer (JTC) where necessary.

2.6. Data collection

Data on the study design, the setting, the population, the intervention, the outcomes and results, and risk of bias were collected