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Nutritional interventions among old people receiving support at home

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With the focus of care shifting from the hospital to the community, supportive nutritional care to old people is to become an important issue to address in the community, since undernutrition has serious consequences, both for the quality of life and for the health care costs. Several modifiable nutritional risk factors relate to undernutrition. Unfortunately, the problem with (risk of) undernutrition is aggravated due to a lack of alertness among e.g. health care staff, leading to insufficient attention for systemic screening and nutritional care. Only a few of the existing screening tools have been validated among old people receiving support at home. Few studies have assessed the beneficial effect of nutritional support among old people in their own home, and recently, it was concluded that such have shown limited effects. One reason may be that the nutritional interventions performed have not taken the multiple nutritional risk factors afore-mentioned into consideration when formulating the action/ treatment plan and hence not used a multidisciplinary approach. Another reason may be that the intervention studies have not used validated screening tools to identify those old people most likely to benefit from the nutritional support. However, three recent studies have used a multidisciplinary approach and two have proven a beneficial effect on the quality of life of the old people and the health care costs. These findings suggest that when planning nutritional intervention studies for old people receiving support at home, modifiable nutritional risk factors should be taken into consideration, and a multidisciplinary approach considered.

Nutritional risk factors: Nutritional screening: Multidisciplinary nutritional support

The share of the population aged 80 years and older in the European Union is projected to almost triple between 2011 and 2060[1]. Because of the demographic transition, it is projected that the old-age dependency ratio is to be more than double from 27 % in 2012 to 53 % by 2060[1].

Effective and good care in the community is necessary to prevent disease, to manage chronic illness and to keep older people independent as long as possible[2]. Alongside ageing come special health challenges, such as dependency, limited mobility, frailty and other physical or mental health problems[2]. In addition, with the focus of care shifting from the hospital to the community, supportive nutritional care is to become an important issue to address in the community[2].

Prevalence and consequences of undernutrition among old people receiving support at home

In general, low BMI and unintended weight loss have been shown to have serious consequences among old people and can result in compromised quality of life, chronic disability, decline in physical, cognitive and social function, increased health care cost and death[3]. One major consequence of undernutrition is the loss of muscle mass (sarcopenia), which contributes to the limitations in physical activity and decreases a capacity for rehabilitation, especially in old people[3].

Specifically, with regard to old people receiving support at home, studies have found that 20–30 % are underweight and/or suffer from unintended weight

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loss[4–8]. This relates to increased risk for dependency in activities of daily living and increased need for care[4–8].

Costs of undernutrition and cost-effectiveness of nutritional support

On an international level, health care costs are continuously increasing[3]. In a report from UK, it was estimated that public expenditure on disease-related undernutrition in 2003 was >7·3 billion £/year, or ≥10 % of public expenditure on health. Most of the expenditure on disease-related undernutrition involved people aged >65 years, who accounted for only about15 % of the general population. About half the cost of undernutrition occurred outside hospitals, mainly for long-term residential care for the elderly[3]. In 2016, Elia et al.[9] published a systematic review of the cost and cost-effectiveness of using standard oral nutritional supplements (ONS) in the community and care home settings. The authors concluded that the reviewed studies indicated that ONS used in the community produced an overall cost advantage or near neutral balance, often in association with clinically relevant outcomes, suggesting cost-effectiveness[9]. For example, studies using economic modelling involving ONS administration in the community to old people at nutritional risk found net annual cost savings of £16 million in the UK or €13·3 million in the Netherlands[9]. In another systematic review of the economic value of enteral medical nutrition in the management of disease-related malnutrition by Freijer et al.[10], it was also concluded that the use of enteral medical nutrition in the management of disease-related malnutrition could be efficient from a health economic perspective. As an example, managing all eligible community-dwelling elderly patients in the Netherlands suffering from disease-related malnutrition (based on a population of 720 223 patients living in residential homes and home care) with ONS during 3 months seemed to be cost saving, as the total costs of disease-related malnutrition in this patient population diminished from €275 643 to €262 657 million due to a reduction in (re)hospitalisation[10].

Unfortunately, from the two systematic reviews, it is not clear if any of the reviewed papers include old people receiving support at home. In addition, both papers only consider the cost of the ONS provided and not the cost of the staff, e.g. registered dietitians, who probably have provided some dietary advice in relation to the ONS.

Modifiable nutritional risk factors among old people receiving support at home

Undernutrition is best described as a process: It begins with the presence of nutritional risk factors, progresses to inadequate intake relative to nutrient needs, and is followed by preclinical symptoms and, finally, measurable signs and symptoms[11]. A nutritional risk factor is defined as an attribute or characteristic, the presence of which may lead to overt undernutrition[11]. Undernutrition risk occurs when one or more of these risk factors are present and the use

of the health care service will continue to grow if potentially modifiable nutritional risk factors are not managed[11]. A systematic review of sixteen studies has identified several such potentially modifiable risk factors consistently associated with increased likelihood of weight loss, low BMI or poor nutrition among old nursing home residents; i.e. eating dependency (e.g. not classified as independent in activities of daily living (ADL) performance); chewing problems (e.g. poor mastication, decreased sensation/motor control); swallowing problems (e.g. dysphagia) and oral health problems (e.g. mouth pain or broken, loose, or carious teeth)[12].

However, studies among old people in home care settings have confirmed that these nutritional risk factors are also related to undernutrition in this group[6,13,14].

Nutritional risk screenings tools for old people receiving support at home

The problem with (risk of) undernutrition is aggravated due to a lack of alertness among, e.g. health care staff working in the old peoples own home, leading to insufficient attention for systemic screening and nutritional care[3].

In Europe, the European Society for Clinical Nutrition and Metabolism published in 2002 the ESPEN Guidelines for Nutrition Screening[15]. The screening tools proposed are: (A) the malnutrition universal screening tool for the community; (B) the nutritional risk screening 2002 for the hospital and (C) the mini nutritional assessment (MNA) for the older adults[15]. Besides the MNA, a wide range of nutritional screening tools has been developed for use in older adults[16–18]. As is the case with the MNA, many of these not only focus on nutritional status but also on nutritional risk factors, which seems highly relevant, although many have not been tested for validity and/or reliability[16–18]. In a systematic review of ten of these screening tools, Phillips et al.[16] concluded that the MNA (in its short form MNA-SF) appeared to be the most appropriate nutrition screening tool for use in home dwelling or residential care dwelling older adults. However, other reviews have been less positive with regard to the predictive capability of the MNA[17,18].

One major problem with these screening tools, including the MNA, is that often they do not link to a treatment/action plan[16]. If they were able to be linked to such a treatment/action plan, a recent systematic review has shown that the types of nutrition intervention that were identified included dietetics care, nutrition education and referral to meals on wheels services and community services[19]. As it appears, the suggested interventions has limited focus on the nutritional risk factors identified, and i.e. does not include oral health care, texture modification of food or assistance with eating. In addition, testing the effect of these interventions in randomised controlled trials has not been done[19].

The lack of focus on nutritional risk factors is in contrast to the work done by an expert panel of interdisciplinary opinion leaders representing academia and the medical

community in the US, who joined together to form the Council for Nutritional Clinical Strategies in Long-Term Care[3]. The base of the clinical guide to prevent and manage malnutrition developed by the Council is on a best-evidence approach to the multidisciplinary management of nutritional problems in the long term[20]. The clinical guide, which was designed to identify and treat reversible causes of protein-energy undernutrition, facilitates the careful analysis of the potential causes of weight loss. It involves nursing staff, kitchen staff, dietitians, physicians, pharmacists, occupational therapists and physiotherapists; and provides suggestions for e.g. the family, food and environmental considerations, and consideration of factors such as acute illness[20]. Unfortunately, apparently no clinical trial has tested the effect of this algorithm.

When validating the different screening tools, one also has to be aware that they might be designed for very different purposes, where one aim might be to predict outcomes related to undernutrition (as e.g. is the case for the MNA) and another aim might be predicting outcomes of interventions (as e.g. is the case for the nutritional risk screening 2002)[21].

Beneficial effect of nutritional support among old people receiving support at home

In general, nutritional support as a priority should be initiated by providing dietary counselling and/or fortified foods, in collaboration with a dietitian. Fortified foods are used to increase the energy and protein intake of a meal without increasing its volume. They are obtained by enriching traditional foods with high-energy and fat products (milk powder, grated cheese, eggs and fresh cream). If these support measures are insufficient, next step is ONS[3].

Three recent systematic reviews suggest that the use of, respectively, fortified food and dietary advice is able to increase the energy and protein intake of old people[22–24]. In addition, two other systematic reviews suggest that the use of ONS may improve clinical outcome such as mortality, and complication rates among old people with decreased nutritional status[25, 26]. None of the reviews has documented a beneficial effect of the nutritional support on functional abilities or quality of life[22–26].

Only few of the studies included in the five reviews[22–26] have been performed among old people receiving support at home. Hence, regarding the effect of, respectively, fortified food, dietary counselling or ONS provided to the population, there are no specific conclusions.

Beneficial effect of multidisciplinary nutritional intervention among old people receiving support at home

In a recent critical appraisal, it was concluded that currently nutritional intervention studies for malnourished community-dwelling older adults show limited effects, which may be caused by methodological shortcomings and participants not meeting treatment goals[2]. One reason for this limited effect may be that the nutritional

interventions performed have not taken the multiple nutritional risk factors afore-mentioned into consideration when formulating the action/treatment plan and hence not used a multidisciplinary approach. Another reason may be that the intervention studies have not used validated screening tools to identify those old people most likely to benefit from the nutritional support.

In the preliminary draft for online voting (May 2017) the European Society for Clinical Nutrition and Metabolism guidelines on clinical nutrition and hydration in geriatrics, both of these aspects are taken into consideration in the formulating of the guidelines. Based on the papers included in the draft and a search for related articles in PubMed (June 2017), three studies using a multidisciplinary approach were identified, and are described later.

The first study, described in two papers, is the B-NICE randomised controlled trial by Locher et al.[27, 28]. In this study, the baseline assessment of the participants included social, psychological, economic, medical, functional and oral health factors known to be related to nutritional intake. Even though the baseline assessment had a multidisciplinary approach, the obtained information was apparently 'only' used in the individually tailored counselling by a registered dietitian. The target group were older adults receiving supportive home help services, who were either, underweight or had a dietary intake insufficient to maintain current body weight[27]. Since a self-management approach was used, the dietitian focused specifically on encouraging participants to: (1) participate in the planning of meals and to consume foods that were familiar and well-liked; (2) eat meals with others present and at the table (if possible); (3) modify foods (e.g. eat items as finger food) and/or modify environment; (4) use community food programmes and (5) use government programmes[27]. Forty participants were randomised into the study and thirty-four participants were included in the analyses; sixteen assigned to usual care and eighteen assigned to intervention. The intervention was feasible but did not result in any difference between groups in the outcome measures dietary intake and weight 60 d post-randomisation[28].

The second study is a randomised controlled trial by van der Pols-Vijlbrief et al.[29]. The study was performed among 155 community-dwelling participants (seventy-nine in the intervention group) receiving support at home with or at risk of undernutrition, according to the short nutritional assessment questionnaire screening tool. A checklist was administered to all participants (intervention and control group) as part of the baseline examination and served as the basis for the personalised action plan in the intervention group. The checklist consisted of seven potential causes of undernutrition, each addressed with one or two questions. Action was required for both taste and appetite when either one was rated as average/poor/very poor. For intake of snacks, action was required when fewer than three snacks daily were consumed. Furthermore, action was required when intestinal problems were present, when partial or full support with daily grocery shopping was needed, and when participants did not meet the Dutch guidelines for healthy physical activity, meaning they were

physically active on <5 days/week, for 30 min/d. Action was also required when participants suffered from pain while standing or in sitting position, and when participants had (very) poor or average oral health or if there were any specific oral problems[29]. The results showed no statistically significant effects on body weight, mid-upper arm circumference, grip strength, gait speed and 12-item Short-Form Health Survey physical component scale as compared with usual care, but there was an positive effect on the 12-item Short-Form Health Survey mental component scale. In addition, borderline significant intervention effects was found for both objective and subjective physical function measures; short physical performance battery and ADL-Barthel score and societal costs in the intervention group were statistically non-significantly lower than in the control group[29].

The third study is an 11-week cluster randomised trial with a home-care (three clusters) or nursing home (three clusters) setting as the unit of randomisation by Beck et al.[30,31]. Before starting the intervention, a nutrition education programme was performed, including three whole-day courses plus train-the-trainer sessions and study circles, educating selected staff members to accept the role as nutrition coordinator. In addition to the educated nutrition coordinator, the participants assigned to the intervention group received the new model for multidisciplinary nutrition support during the 11-week study. Focus was on individual treatment of the potentially modifiable nutritional risk factors identified by the eating validating scheme, by involving physiotherapist, registered dietitian and occupational therapist, as relevant according to the eating validating scheme and independent of the municipality's ordinary assessment and referral system. The intervention contained a formalised multidisciplinary collaboration, including a meeting once weekly to discuss, evaluate and adjust the multidisciplinary support of each of the participants[31]. Respectively, fifty-five (forty-six from two home-care clusters) and forty (eighteen from one home-care cluster) were identified with the eating validating scheme and comprised the intervention and control groups. A positive effect of the intervention was seen after 11 weeks in quality of life, 30 s chair stand and oral care. In addition, there was a borderline significant lower mortality[31]. The results from the total group were reflected in the results found for the participants receiving home care. In addition, the number of hospitalisations for this group was borderline, significantly reduced[31]. The effect on quality of life, measured in terms of quality-adjusted life year gain relatively to the control group, gave a cost-effectiveness ratio of Danish kroner 46 000 per quality-adjusted life year gained which compares reasonably well to other interventions found worthwhile in the Danish healthcare sector[30].

Conclusion

Undernutrition is highly prevalent among old people receiving support in their own home but suitable screening tools are lacking. Several potentially modifiable risk factors have been identified which are consistently associated with increased risk of undernutrition. When planning nutritional intervention studies for old people, receiving support at home these modifiable nutritional risk factors should be taken into consideration, and a multidisciplinary approach considered.

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