Meals-On-Wheels with Individual Dietary Counseling Can Improve Nutritional Status in Older People

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Abstract

Background: A balanced diet and regular meal patterns contribute to health and quality of life among older people. The aim of this study was to evaluate the effects of individual dietary counseling on nutritional status among community-dwelling older people (≥ 75 y) receiving Meals-On-Wheels (MOW).

Methods: This study population consisted of 100 community-dwelling participants at risk of malnutrition in the year 2005, intervention group ($n = 49$) and control group ($n = 51$). Data of nutritional status, body weight, body mass index and plasma albumin were collected at the beginning of the study and at a two-year follow-up. The Mini Nutritional Assessment (MNA) test was used for nutritional screening.

Results: Persons in the intervention group improved their nutritional status statistically significantly compared to the control group. The change between groups in MNA score was 3.14 (95% Confidence Interval [CI]: 1.33 to 4.01) and in serum albumin 1.48 g/L (95% CI: 0.02 to 2.93 g/L).

Conclusions: It seems that dietary counseling with MOW improves the nutritional status in older people. MOW should be integrated with nutrition counseling.

Keywords: Dietary counseling; Meals-on-wheels; MNA; Nutritional intervention; Older people

Introduction

The risk of malnutrition is quite common among community-dwelling older people, ranging between 5 and 40% [1,2]. Several concomitant diseases, the symptoms of depression [3,4], both functional and mental dependency [5,6] and polypharmacy [7] have been associated with an increased risk of malnutrition. Many studies indicate that diet of older people is low in calories and other nutrients [8]. Within the community, efforts have been made to develop nutrition programs targeting older people of high nutritional risk. Meals-On-Wheels (MOW) services are part of this effort. A balanced diet and regular meal patterns contribute to the health and quality of life among the older people

[9,10]. Reduced mobility, poor health, and lack of social support all contribute to food insecurity and are common reasons for referral to MOW [11].

In Finland, mass catering plays a key role in the implementation of nutrition policy and catering is also linked to social and welfare policy. About 25% of Finns aged above 80 years use MOW [12]. Maybe the MOW play an important role in maintaining the nutritional status and health quality [10,13,14]. However, this on not supported in the recent studies [15,16] which failed show proof of improvement of the nutritional status of clients without dietary counseling. The aim of this study was to evaluate the effects of individual dietary counseling on nutritional status among community-dwelling people aged 75 years or older receiving MOW.

Methods

A subgroups analysis of a population-based comparative study, the Geriatric Multidisciplinary Strategy for the Good Care of the Elderly (GeMS) was carried out in the city of Kuopio, Finland, from 2005 to 2007. The present analysis included 100 persons at risk of malnutrition receiving MOW ≥ 2 times a week, 49 in the intervention and 51 in the control group.

All participants were interviewed and examined yearly by the nurses. Data collection, including nutritional assessment, was supplemented by a caregiver interview if the participant had cognitive impairment. The nutritional screening was performed using the Mini Nutritional Assessment (MNA)-test [17], scores 17.0-23.5 indicate the risk of malnutrition. The MNA test is a validated and standardized screening tool developed to detect nutritional problems in older people. A score of < 17.0 indicates existing malnutrition, a score of 17.0 to 23.5 a risk of malnutrition, while a score of ≥ 24.0 indicates a good nutritional status. In this study, the researcher (an authorized nutritionist) trained nurses to use the MNA form, and the nurses completed the forms. The plasma albumin levels were measured according to the standard protocols at the local municipal hospital. Comorbidity was

computed using the Functional Comorbidity Index (FCI) [18]. Cognitive assessment was performed with the Mini-Mental State Examination (MMSE) with scale from 0–30 and higher scores indicating better function [19]. Self-rated health was determined using a 5-step scale (very poor, poor, moderate, good and very good). In the analyses the variable was dichotomized to poor and good self-rated health, with the two first steps representing poor and the three latter good. Use of prescription and non-prescription medications was self-reported by participants during the interviews and verified from prescription forms, drug packages and medical records.

Meal service assessment included questions about how many times MOW were used per week. The participants receiving MOW ≥ 3 times a week were included in this study.

Nutritional Intervention

The main aim of the intervention was to help participants improve the wholesomeness of their diet by increasing the frequency of meals and/or adding energy and proteins to the meals without nutritional supplements.

During the first visit in 2005, the authorized nutritionist collected important information such as the client's history of health problems, current dietary intake and specific nutritional problems, food preferences and appetite status. Based on this evaluation, the nutritionist helped the participants draw up their own meal plan with enough energy and proteins. Special leaflets covering topics such as snacking were handed out. Telephone calls once every month by the nutritionist provided opportunities to reinforce the dietary advice and give additional support. Participants' family members were encouraged to attend the dietary counseling sessions. Participants with cognitive impairments had a caregiver present during the sessions; written informed consent was provided by participants and caregivers. During the second visit in 2006, the nutritionist made requisite changes according to the treatment protocol. The participants in the control group did not receive intervention but took part in the annual interviews and measurements.

All participants gave written informed consent to participate in the study. The study protocol was approved by the Research Ethics Committee of the Northern Savo Hospital District, Kuopio, Finland.

Statistical analysis

The participants receiving MOW were categorized into two groups, the intervention and the control group. Statistical comparisons were made between the groups at the baseline using chi-square test or t-test, with ≤ 0.05 considered significant. The results were expressed as means or frequencies with Standard Deviations (SD) or percentile. The Mixed Model of linear regression was used to assess the effects of the nutritional status between the years 2005 and 2007. The results were reported as adjusted (age, sex, MMSE) mean differences in MNA and serum albumin. Analyses were performed using SPSS version 19.0. (SPSS, Inc., Chicago, IL).

Results

Participant characteristics are summarized in Table 1. The mean age of the study population was 83.5 in the intervention group and 84.3 in the control group; in both groups 78% were women. The proportion cardiovascular disease was 78% ($n = 78$) and dementia 22% ($n = 22$) in the whole study sample. One fourth (25%) of participants rated their health as poor. At the baseline, there were no statistically significant differences between the intervention and the control group regarding demographic characteristics, nutritional status or cognitive impairment.

After the two-year follow-up, the mean MNA scores improved by 1.21 points in the intervention group and decreased by 1.95 points in the control group (Table 2). Levels of plasma albumin increased in intervention group, but decreased in the control group. The difference in MNA scores [3.14 scores 95% confidence intervals (CI): 1.33–4.01] and albumin level (1.48 g/L, 95% CI: 0.02–2.93 g/L) between the two groups was significant after adjustment for age, sex and MMSE scores.

Discussion

According to our study, nutritional counseling for older persons receiving the MOW improved their nutritional status. However the MOW without dietary counseling impaired their nutritional status measured by the MNA scores and plasma albumin levels.

Recipients of the MOW are vulnerable, with several health problems and disabilities [20,21]. Previous studies have shown

Table 1: Characteristics of participants with risk of malnutrition and meals on wheels by study groups.

	Intervention group (N = 49) mean (SD)	Control group (N = 51) mean (SD)	P value
Age	83.5 (4.8)	84.3 (4.2)	0.481
Women	38 (77.6)	40 (78.4)	0.849
BMI kg/m ²	26.7 (5.4)	26.1 (4.7)	0.981
MNA	21.7 (5.5)	22.7 (3.0)	0.367
Albumin g/L	35.3 (3.2)	35.9 (3.8)	0.639
FCI, mean (SD)	3.4 (1.9)	3.5 (2.0)	0.641
Cardiovascular disease, n (%)	38 (77.6)	40 (78.4)	0.767
Dementia, n(%)	11 (22.4)	11 (21.6)	0.812
MMSE ≤ 24 , n (%)	27 (55.1)	26 (50.1)	0.106
Poor self-rated health, n (%)	12 (24.5)	13 (25.5)	0.656
Drugs in regular use, median (IQR)	5 (3-7)	5 (3-8)	0.976
IADL, median (IQR)	6 (3-7)	6 (4-7)	0.988
Walks 400 m independently, n (%)	35 (71.4)	35 (68.6)	0.265

SD = Standard deviations; BMI = Body mass index; MNA = Mini Nutritional Assessment; FCI = Functional Comorbidity Index; MMSE = Mini Mental State Examination; IQR = interquartile range

Table 2: Changes in nutritional status from baseline to 2-years and differences between intervention and control groups among meals-on-wheels users.

	Mean change 2005 to 2007 (95% CI) Intervention group (n = 49)	Mean change 2005 to 2007 (95% CI) Control group (n = 51)	Mean difference between groups* (95% CI)
MNA, score	1.21 (-0.42 to 2.68)	-1.95 (-0.92 to 2.90)	3.14 (1.33 to 4.01)
Albumin g/L	1.87 (0.61 to 3.12)	-0.38 (-1.92 to 1.25)	1.48 (0.02 to 2.93)

*Adjusted for age, sex and MMSE

MNA = Mini Nutritional Assessment; MMSE = Mini-Mental State Examination

that majority of recipients of the MOW (74% to 98%) were at nutritional risk [22,23]. Furthermore, many older people have physical problems that make it difficult for them to consume certain foods [10]. According to our findings a previous study [24] found that nutritional counseling has a significant impact on the nutritional status and health of persons receiving the MOW service. Appropriate nutritional intervention for the recipients of the MOW seems to improve nutritional status.

The MOW service is based on the assumption that all food in the meal is actually consumed, which leads to an overoptimistic impression of the nutritional value of the meals. This is supported in the results of Roy and Payette's study where nineteen subjects (95%) usually or never consumed their entire meal, and eight (40%) subjects reported that they threw away parts of their meal [21]. The reasons for throwing out part of the meal maybe unappetizing food, food with unsuitable textures or portions are too big [25-27]. However, two-thirds (67%) of recipients were satisfied with meal quality, time of delivery, variety, choice, and temperatures of foods most of the time although they cannot choose their own foods [25,27].

In our study, the positive effect of dietary counseling on nutritional status might be explained by the individually tailored interventions for persons in the intervention group. The nutritionist increased the frequency of meals and added energy and proteins to the meals case-specifically. The beneficial effect of the intervention among persons at risk of malnutrition is important from a public health viewpoint, as the risk of malnutrition, even malnutrition, is common among community-dwelling older people and when left under-treated, causes many difficulties. More attention should be given to this group to improve their health status with energy- and protein-rich food.

The strengths of the present study were the population-based design, the fact that participants underwent comprehensive interviews and assessments, as well as the fact that the study design and data collection was conducted by a multiprofessional research team. The nutrition intervention included individually tailored personal guidance on nutrition, so it may be assumed that dietary counseling was more likely to be adopted by the participants. Furthermore, the nutrition intervention was performed by the same authorized nutritionist. A limitation was the low participation rate in the nutritional intervention. The design of the study is weaker than a traditional randomized controlled trial, owing to randomization having been performed before the baseline measurements.

Conclusion

Dietary counseling with the MOW improves the nutritional status in older people. MOW should be integrated with nutrition counseling.

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