

***OPTIMIZING THE AMBIANCE
DURING MEALTIMES IN DUTCH
NURSING HOMES***

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NURSING HOMES***

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Optimizing the ambiance during mealtimes in Dutch nursing homes

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'Dat kan ik niet'

Ik ben niet zo dol op 'kan-ik-niet-mensen'.

Mensen die roepen 'dat kan ik niet', al vér vóór ze het hebben geprobeerd. Hoe zo een 'kan-ik-niet-mens' aan die negatieve opstelling komt, weet ik niet; dat is van mens tot mens verschillend; het kan te maken hebben met luiheid, met te weinig zelfvertrouwen, maar welke oorzaak het ook hebben mag, de 'kan-ik-niet-mensen' doen zichzelf veel te kort.

Leven heeft nou eenmaal te maken met creativiteit, en elke dag van je leven geeft je ruimschoots de kans om alles te proberen wat je maar proberen kunt.

Toon Hermans in "Wie is jong, wie is oud"

ABSTRACT

Context: Mealtime is one of the highlights in the daily routine of a nursing home. Neglecting meal environment is considered as one of the causes of malnutrition among nursing home residents. We hypothesized that family style meals instead of tray service meals improves quality of life and nutritional status of nursing home residents.

Objective: To assess the impact of family style meals on quality of life and malnutrition.

Design, Setting and Participants: In 2002 a cluster-randomized trial was conducted among 178 residents (mean age 77 years) in five Dutch nursing homes. Within each home, two wards were randomized in intervention (n=95) and control group (n=83).

Intervention: During six months the intervention group had their meals in family style, and the control group received the usual individual pre-plating services.

Main Outcome Measures: Outcome measures were quality of life (range: 0-100 units), food intake (kJ), Mini Nutrition Assessment tool (MNA), and body weight (kg). Quality of life comprised perceived safety, autonomy, sensory, physical, and psychosocial functioning.

Results: The difference in change between groups was statistically significant for overall quality of life 6.1 units (95% Confidence interval, CI [2.1-10.3]), daily energy intake 991 kJ (95% CI [504 – 1479]) and body weight 1.5 kg, (95% CI [0.6 kg-2.4 kg]). The percentage of residents in the intervention group classified by the MNA as malnourished decreased from 17 % to 4% while this percentage increased from 11 % to 23% in the control group.

Conclusion: Family style meals stimulate quality of life, daily energy intake and protect nursing home residents against malnourishment. Therefore, replacement of the pre-plating meal services with family style meals in nursing homes is recommended.

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CHAPTER 1: INTRODUCTION

In 1999 the Dutch health inspection published the report: 'Beverage – and food services in Dutch Nursing homes: policy and practice' [Vocht- en voedselvoorziening in de Nederlandse verpleeghuizen: beleid en praktijk].¹ One of the most striking conclusions of this rapport was that in general meal serves in Dutch nursing homes did not fulfil the required standards of professional care. One reason was the lack of a homelike and pleasant atmosphere during the meals. In 80 percent of the Dutch nursing homes meals were served in individually pre-plated services. Residents received their entire meal on a tray and often their main course was served on a pre-divided plate. Depending on the resident's preference, they have their meal in a common dining room or in their own room. This meal services practice, in absence of a pleasant environment, does not stimulate residents' appetite and meal enjoyment. The issue of not well functioning meal services is dramatic when the nutritional status of these residents is taken into account. Literature suggests that 50 % of the nursing home residents have an insufficient intake of water-soluble vitamins (B vitamins and vitamin C) and that 30 % is malnourished at admission.^{2 3} The combination of a decreased appetite and insufficient food intake can lead to unintentional weight loss and malnutrition. Furthermore, it may also result in a decrease of general well-being of the elderly.⁴⁻⁶

Prevention of malnutrition has favourable effects on functional independency and the quality of life of nursing home residents.^{4 5} Therefore it is worthwhile to investigate the impact of family style meal services on malnutrition and quality of life of Dutch nursing home residents. Many Dutch nursing homes currently plan major infrastructural reorganisations to offer each resident their own room and better care services. These services may include family style dinners.

BACKGROUND

Prevalence of malnutrition in nursing homes

Recently, a nationwide Dutch prevalence study estimated that 17 % of the Dutch nursing home residents is malnourished and 22 % is at risk for malnutrition.⁷ Worldwide prevalence of malnutrition among elderly living in nursing homes is estimated between 17 % up to 65 %.⁸ This wide range might be partly the result of the many different methods and parameters that are used to measure nutritional status and subsequently define malnutrition and the different institutional settings in the world. Malnutrition is a generic term which encompasses weight loss and decrease of biological functions resulting from a lack of nutrients in general.⁹ Among elderly malnutrition can be classified into cachexia (involuntary loss of fat free mass without weight loss), wasting (involuntary weight loss) and sarcopenia (loss of muscle mass and strength).⁹ These conditions are determined by a variety of causes, among which physiological, psychological, medical, social, and environmental factors. Malnutrition has serious negative consequences, such as a higher prevalence of infections, hospitalisation, dysfunctions and an increased morbidity and mortality.⁹⁻¹² More importantly malnutrition has a negative impact on resident's independency.

The prevention and treatment of malnutrition can be focused on different elements; the food itself (texture, flavour enhancement, palatability), food supplements (protein-energy oral supplementation, nutritional supplements), biochemical stimuli (medroxyprogesterone acetate, serotonin antagonists, nitrates,

anti-depressiva) and the environment (feeding assistance, dinner music, verbal and social cueing). Malnutrition, in nursing home residents, is a multifactorial problem, and as a consequence it has to be tackled with a multi stimulus intervention. One important stimulus, which can be modulated easily, is the meal ambiance.

In conclusion, a high prevalence of malnutrition among nursing home residents is observed, which needs a multidisciplinary treatment.

Quality of life in nursing homes

Quality of life (QoL) of older persons in institutions is a critical consideration in national health care policy and decisions due to the rapidly increasing proportion of the older population worldwide.¹³

Nursing home residents have a variety of health needs resulting from chronic diseases. These chronic diseases can result in a level of impairment, disability, and handicap requiring nursing home admission. Both the admission to a nursing home and chronic diseases have considerable impact on the quality of life of the elderly people as it involves their physical capacities, their psychological well-being and their social life. Therefore quality of life is often judged as rather low. An American study showed that on average nursing home residents (length of stay > 6 months) had a perceived quality of life of 6.7 on a scale from 0 (extremely dissatisfied) to 10 (extremely satisfied) while older adults with at least one chronic condition scored 7.6 and older healthy adults 8.5.¹⁴ More than 50% of these nursing home residents had a low perceived quality of life (< 6.9) as compared to only 31 % and 6 % of the other two groups. These numbers are similar in the Dutch nursing home population.^{15 16} Besides achieving a professional quality of care and physical and mental health outcomes, long-term care should preserve and promote quality of life. Improving the quality of life for nursing home residents is a major challenge worldwide.

In conclusion, due to their increased dependence for care of others, nursing home residents are at risk for a low quality of life

THEORETICAL FRAMEWORK

Food intake and social facilitation

Food choice, and therefore food intake, is influenced by a large number of interrelated factors, which can be divided in internal signals (satiety, hunger, thirst, appetite i.e.) and external signals (social environment, economics i.e.).¹⁷ During the aging process the balance between the internal and the external signals seems to shift from predominately internal to external signals. Newborn's food intake is predominantly stimulated by internal signals and during our life's we are learning to be more susceptible for external signals as time of the day, company and environment. The physiological mechanisms that operate to control food intake and body weight in young individuals are getting less important over time.¹⁸⁻²⁰

De Castro (2002) showed for different age groups a positive correlation between self-rated hunger before a meal and actual energy intake during a meal. However these correlations were significantly smaller for older individuals. Therefore the influence of hunger on intake may be smaller in elderly than in young individuals compared to younger individuals.²¹ In a study of Zandstra et al. (2000) different age groups had to rate their subjective feelings of hunger and satiety after four preloads with different energy levels (control: 0.7MJ/500g, high in carbohydrate: 2 MJ/500g,

high in fat: 2 MJ/500g, high in carbohydrate and fat: 3MJ/500g). The appetite ratings between the four different energy levels differed more in the young adults than in the elderly.²⁰ This indicates that the elderly were less sensitive to the energy content of the preloads. Moreover Roberts et al (1994) showed that aging is also associated with an impaired ability to accurately regulate food intake. After a period of overfeeding or underfeeding older subjects could not regain their previous weight-maintenance requirement.²² Their ability to compensate after a period of a positive or negative (e.g. due to illness) energy balance decreased.

Hence, the decline in the effectiveness of the physiological systems with age makes the elderly particularly vulnerable to a decline in intake and unable to rebound from deficits. Although the elderly have difficulty compensating for deficits automatically by physiologically-induced adjustments, studies of real world intake suggest that compensation can also be produced by adjustments in external signals, i.e. the environment.²³ Therefore, if the elderly are responsive to external environmental variables, care should be taken to ensure a healthy and home-like environment.^{18 24}

Research of deCastro (1992) showed that people tend to eat more when in company of others compared with eating alone. This could be explained by the process of social facilitation; the enhancement of a behaviour due to the sheer presence of others. Social or interpersonal influences on food intake are the influences that one or more subjects have on eating behaviour of others, either direct or indirect, either conscious or subconscious. Eating with others has shown to lead to an energy intake increase of up to 76% compared to eating alone.²⁵ DeCastro (1992) has shown that meals eaten with one other person were 33 % larger than those eaten alone, and consumption increases of 47%, 58%, 69%, 70%, 72% and 96% have been respectively associated with meals eaten with two, three, four, five, six and seven or more people.²⁵ Elderly subjects (65+) appear to be as responsive as their younger counterparts.²¹ This holds not only for the number of participants at a meal, but also for palatability, their intention to reduce intake (cognitive restraint) and time of the day. On the other hand energy intake of elderly subjects, in contrast to the younger subjects, is not depending of weekdays.²¹

The reason why people would eat more when more others are present are yet partly unknown, and might be conscious and subconscious. Research of Feunekes (1995) showed that social facilitation of energy intake is mediated by extending meal duration, which was partly due to a more sociable atmosphere.²⁶ Recent research of Bell and Pliner (2003) confirmed this pathway.²⁷

Another pathway is the suggested theory of distraction by Hetherington (2005). Preliminary study results suggest that distraction (by the table company) may enhance food intake by drawing attention away from the normal progression of satiety during a meal.²⁸

These data suggest that alterations in the social, temporal, environmental, or hedonic conditions of eating could induce desired alterations in the nutrient intakes of the elderly. Nursing home studies of real world eating behaviour have produced evidence that suggests that this strategy works.²⁹⁻³² It remains for future applied investigations to ascertain whether or not this strategy is effective in treating malnutrition in the elderly.

In summary, aging is associated with an impairment in the regulation (internal stimuli) of food intake that hinders appropriate short-term and long-term compensation for imposed alterations in energy intake. However elderly responsiveness to environmental (external) stimuli does not change and therefore social facilitation might contribute to a better food intake.

Quality of life and nutritional care

Gerritsen et al. (2004) reviewed six quality of life frameworks which address nursing home residents and they stipulate that the Social Production Function (SPF) theory provides tools for optimising quality of life and can form the basis for the development of guidelines for quality of life enhancement.³³

This theory basically asserts that people produce their own well-being (Quality of Life) by trying to optimize their physical well-being and social well-being via six instrumental goals within the environmental and functional limitations they are facing.^{33 34} These instrumental goals are activation / stimulation (optimal level of arousal), external (pleasant environment) and internal (absence of physiological needs) comfort, status, behavioural confirmation and affection.³⁴ This is achieved by using one's own preferred resources / activities (for example food, health care, money, a spouse or social activities).³³ To a certain extent, these resources are interchangeable. If a certain resource is no longer available, well-being goals can be achieved by using other resources provided they are still present. Still this theory should be systematically empirically tested.³³

To effectively optimize Quality of life it is among others necessary to obtain information about the individual's resources and preferences. It is expected that residents could have great difficulty in recuperating from the losses they are so often confronted with during admission at the nursing home.³⁵ (According to the SPF-theory) Moreover, they must (repeatedly) adjust to a new situation with more limitations than before.³⁶ In order to adapt to the new situation, the resident's preferences have to be redirected, and in this respect, it is highly important that the nursing staff focuses on the remaining strengths and potentials, and assists the resident by maintaining these strengths. Autonomy is one dimension of quality of life which in many nursing homes is not self evident.³³ The specific context of nursing homes may pose threats to the resident's sense of self-direction, freedom of choice and perceived control. Interventions to enhance quality of life should be based on the residents' strengths and preferences; therefore it contributes to a more resident-tailored care that targets quality of life.³³

Food is an integral part of our well-being and Quality of life; it extends beyond simply satisfying hunger and providing nourishment.³⁷ Good food is a sensory and psychological pleasure in its own right. Meals may also add a sense of security, meaning, order, and structure to an elderly person's day and stimulate feelings of independence, control, and sense of mastery over his or her environment and provide opportunities for making food choices.³⁸ Furthermore the control of food of choice and/or preparation may improve self-esteem.^{13 39} Specific foods have symbolic meanings, and particular food habits are influenced by religious, cultural, social and emotional experience. Therefore despite the fact that some dietary interventions are unlikely to lessen disability or extend life expectancy, they may be worthwhile if they enhance an elderly individual's well-being or Quality of life.⁴⁰

Nutritional care especially during mealtimes might stimulate resident's perceived autonomy, perceived control, self-esteem, satisfaction and enjoyment and therefore indirectly stimulate general well-being of nursing home residents.

STATE OF THE ART

Food and nutrition are essential components of “the good life”.^{37 38} Mealtime might be a moment for socializing with other residents and staff, making personal choices according to one's preferences, and under well organized circumstances a moment of rest and peace.

The results of four previous intervention studies in frail elderly on meal ambiance and nutritional status are inconclusive, due to the small sample sizes, limited study duration or lack of a control group.^{29 32 41} In two studies the food delivery system was changed from a pre-plating service to a more home-like service. One Swedish study created a dining room environment similar to that during the 1940s and meals were served by the staff on serving dishes.²⁹ The Canadian intervention changed the centralized food services to a system in which meal portioning occurs on residents' floor and food items were served sequentially (soup, main dish and dessert). In both studies the intervention resulted in a significant increase in food intake (1400kJ, sd= 800kJ, n=16) (1550 kJ, sd=? n=22); but in neither of the studies body weight significantly changed.^{29 32} This could be explained by the short intervention period (10 and 16 weeks). In a third study, a buffet-style program had no effect, neither on body weight, nor on the biochemical markers of nutritional status of the residents (n=40).⁴¹ In our one-year intervention pilot study, residents (n=22) gained weighed (3.3kg), but no statistically significant increased food intake was reported.³⁰ This negative finding may be attributed to a lack of statistical power (n=22).

It is suggested that quality of life of the resident is correlated with the table companion and self-esteem is correlated to what the resident eats.⁴² Thus, a warm and social mealtime environment might improve the life satisfaction of nursing home residents.^{6 38} Residents with dementia are less irritated, anxious, agitated and depressed and increased their participation and communication when meals are served in a family-style atmosphere or music was played. In a pilot study we showed that improving the social and physical ambiance during the mealtime counteracted a decline of the reported quality of life in Dutch nursing home residents. All of these studies are characterized by a very small sample size (n = 6 to 29), therefore these results have to be interpreted cautiously.^{30 31 43-45}

Optimizing the ambiance during mealtime nurses might counteract both malnutrition and a decline of quality of life of nursing home residents. The mealtime at nursing homes provides an excellent opportunity to integrate and implement physical care (stimulate food intake) with various types of quality of life improving measures. However this has to be confirmed by a long term controlled intervention study.

In summary, research of the effect of family style meals on food intake and quality of life is scarce and inconclusive.

STAFF SUPPORT

Optimizing the ambiance during mealtimes will affect the task of several disciplines in a nursing home and most specifically the role of the nurse. The reason is that mealtimes at nursing homes provide an excellent opportunity to integrate and implement physical care (stimulate food intake) with various types of quality of life improving measures. Thus mealtime care will be extended from merely care for sufficient food intake to care for a socializing time with enjoyable meals consisting of healthy foods and drinks. This holistic resident oriented care will make the dining experience to an important part of the clinical care of the resident. By assuring appropriate nutritional and fluid intake it can help to assure a desirable quality of life.⁴⁶

In many nursing homes care for meals are often task oriented rather than patient / resident-oriented and fail to meet the needs of the residents.⁴⁷ This indicates that residents come to the nursing wards with their individual meal customs and are met by care-givers with an institutionalized culture.⁴⁷ The challenge for the nursing staff should be to acknowledge the identity of elderly, helping to maintain her/his personality, and at the same time link functional and biophysical status to the performance of meal procedures.⁴⁷

Individual preferences of the resident become an important part of the care plan, in addition to the traditional care needs. Moreover, instead of focusing only on the problem-oriented needs and disabilities of the residents, care targets are more concerned with their strengths and abilities. This wider perspective allows care-providers to contribute more effectively to the Quality of life of the residents, which is increasingly becoming the central purpose of these facilities. Family style meals might be one of the instruments to meet this need of a more resident tailored approach in nursing homes.

Earlier attempts to implement a more pleasant ambiance during mealtime caused initial hardship for the staff and extra efforts were needed before general acceptance of the system by the staff was reached.⁴⁸ Insight of the effect of the implementation of family style meals on nursing staff job satisfaction and workload might give valuable information to counteract staff problems during a general implementation of family style meals. Most important with implementing new practices is that nursing staff sees the benefits for the residents without feeling extra workload.

In summary, family style meals might contribute to a more resident tailored care without decreasing work satisfaction of the staff.

RATIONALE

As shown in this chapter family style meals may have an important role in food intake and quality of life. Research of the effect of family style meals on food intake and quality of life is scarce and inconclusive.

Although, research showed that elderly subjects' food intake regulation is less sensitive for appetite, they are still responsive to environmental stimuli (social facilitation). Therefore changes in meal ambiance could induce desired alterations in the nutrient intake of the nursing home residents. Secondly, changing the meal ambiance in a more resident tailored then task/organizational oriented may stimulate resident's perceived autonomy, perceived control, self-esteem, satisfaction

and enjoyment and therefore indirectly stimulate general well-being of nursing home residents.

Changing meal services implies that nursing staff has to change their daily routine and may lead to hardship among the nurses. The latter should be prevented, with efficient strategies.

With this in mind we wanted to answer the following research questions:

How could we improve the ambiance during mealtimes and which are the incentives and pitfalls of these different strategies?

To answer this question we performed an inventory of project strategies used in Dutch nursing homes to improve ambiance during mealtimes. Based on semi-structured questionnaire we identified the incentives and pitfalls that the nursing home staff experienced

What is the mean energy intake of Dutch nursing home residents and how many residents are malnourished or at risk for malnourishment?

What is the effect of family style meals on quality of life among nursing home residents?

What is the effect of family style meals on food intake among nursing home residents and is the effect at all three main meals the same?

What is the effect of family style meals on food group intake among nursing home residents?

What is the effect of the implementation of family style meals on work satisfaction and workload of the staff?

To answer these five questions we conducted a cluster-randomized trial in five Dutch nursing homes. Within each home, two wards were randomized in intervention and control group. During six months the intervention group had their meals in family style, and the control group received the usual individual pre-plating services. Outcome measures were energy intake (kJ), carbohydrate (g), fat (g) and protein intake (g) and Mini Nutritional Assessment score, body weight, quality of life, gross and fine motor function, and work related satisfaction of the staff. The baseline data of this intervention study are used to answer the research question on malnutrition in Dutch Nursing Homes.

OUTLINE OF THE THESIS

In this thesis, we present the data of the inventory and the intervention study. The main findings from these studies are summarized and discussed in the general discussion (**Chapter 7**).

In **Chapter 2** we present the baseline data of energy intake and malnutrition risk of the intervention study. The study population consist of 242 nursing home residents with a somatic chronic disease. In **Chapter 3** we evaluate the results of the inventory of meal ambiance models with their related incentives and pitfalls. In **Chapter 4 and 5** we evaluate the effects of family style meals on quality of life and energy intake. The study population consists of 94 interventions residents and 84 control residents. **Chapter 6** will discuss the energy intake changes over the three main meals and the work satisfaction of the staff (n=55).

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CHAPTER 2: NUTRITIONAL STATUS OF DUTCH NURSING HOME RESIDENTS WITH CHRONIC SOMATIC DISORDER

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Objective. We observed food intake, nutritional status and biochemical health indicators residents of 5 nursing homes and examined the differences between the groups (at risk for) malnutrition and well-nourished according to the Mini Nutritional Assessment (MNA).

Subjects/setting. In total, 242 residents with a chronic somatic disorder of ten long stay care wards participated in a descriptive study. Of the 242 residents, 94 (39%) were male, 51% had a stroke history and 75% were sitting in a wheelchair.

Results. Based on the classification scores of the MNA 15.8% of the residents were malnourished, 62.2% were at risk for malnutrition and 22 % were well nourished. Of these residents, 35% had a n energy intake below two-third of the RDA and high proportions of insufficient intakes (< 2/3 RDA) of vitamin B1, B6, Folic acid and vitamin D were observed. On average the residents had sufficient intakes of dairy products, potatoes, cereals and meat (proteins), but an insufficient intake of vegetables, fruit, bread and beverages. There were no differences between the MNA-groups.

Conclusions. The dietary intake and therefore the nutritional status in long stay nursing home residents with a chronic disorder, is insufficient.

Applications. Structural and adequate intervention is needed by dietary changes, such as extra snacks, fortified food, and liberalization of diet prescriptions but also by intervening in extra feeding assistance and stimulating food services.

Submitted

INTRODUCTION

An adequate nutritional status of the residents should be one of the highest priorities in nursing homes, because malnutrition has a negative influence on the health status of these fragile residents. Malnutrition can lead to weight loss, loss of muscle strength, a decrease in immune status, a deterioration of underlying diseases, a higher co-morbidity and mortality, and a prolonged wound-healing.¹⁻⁴ Furthermore, it can also result in a decrease of general well-being of the elderly.⁵⁻⁷

Malnutrition is a generic term which encompasses weight loss and decrease of biological functions resulting from a lack of nutrients in general.¹ Worldwide, malnutrition among elderly living in nursing homes is estimated between 17 % up to 65 %.⁸ This wide range might be the result of the many different methods and parameters that are used to measure nutritional status and subsequently define malnutrition. Unintentional weight loss and decreases in BMI are reliable indicators of protein energy malnutrition (PEM). In practice, however, caretakers want to prevent these indicators instead of cure them. For them the Mini Nutritional Assessment[®] (MNA) is a more extended tool to screen for malnutrition, including medical, physiological, psychological and nutritional data.⁹ The food intake part in the MNA is semi-quantitative, as it is related to number of meals, intake of food groups and autonomy of feeding.¹⁰ It is unknown how much the food intake items of the MNA contribute to the classification scores of MNA in malnourished, at risk and well nourished.

Many studies that looked at nutrient intake to assess nutritional status have used food records or a food frequency questionnaire, which are less precise as the observation and weighing back method.¹¹ The observation and weighing back method is based on what is actually eaten and does not rely on residents memory and therefore the estimations of energy, macro and micronutrients intakes are reliable if performed over more than one day.¹² The MNA combined with this food intake data would complete the overall picture. Studies who combined both are rare or their research population is rather small (n=89).¹³

2.5 % of the Dutch people who are older than 65 live in a nursing home, this number is even higher (5%) in the USA. Since malnutrition is highly prevalent in nursing homes, it is of major importance to determine the dietary intake and its relation with nutritional and health status before suitable interventions are possible.⁸ Therefore we conducted an observational study in which food intake and biochemical health indicators were observed and differences examined between the groups (at risk for) malnutrition and well-nourished according to the MNA.

METHODS AND MATERIALS

Recruitment

The nursing homes (NHs) were recruited by an advertisement in a nationwide journal for nursing homes. Only medium sized NH (175-275 beds) with a general nursing home population located in different parts of the country were included. Residents were included when their main diagnosis was of somatic nature and received long term care or were permanent residents. Residents were excluded when they received palliative care or had total parenteral feeding. In total 282 residents with a chronic somatic disorder were approached. All residents received

an information brochure of the study, and were invited to attend an information meeting. Written informed consents were obtained after the meeting by the nurses. All residents had to sign an informed consent and the medical ethics committee of Wageningen University, the client board and medical ethical committees of the participating nursing homes approved the research protocol.

Demography and life style characteristics

Information on sex, age, length of stay, number of drugs, number of diseases, dietary supplements, dental status, and mobility were collected from the nursing files of the residents. The height of residents was measured by the knee-to-floor height (KFH). Body height was derived using the following formula: height (in cm)=3.16*KFH (in cm).¹⁴ The BMI was calculated (kg/m²) based on these parameters.

Intake of energy, macro and micronutrients intake

During three weekdays trained project dieticians measured food intake with the observation and weighing-back method.¹² Per ward of 25 residents, 3 observers recorded the food intake. An observation day started at 6.00 AM and ended at 10.00 PM. All foods and beverages consumed by the residents during the three days were recorded. Prior to the dietary assessment the content of household equipment (spoon, cup...etc), portions sizes, and recipes of the meals were measured three times. The mean was used as standard portion. Energy intake during bread-based meals and snacks between meals were measured by observation method using the computed standard portions of the related nursing home. The portion sizes of each meal component of the cooked meals were weighed for three standard meals of each day. These measures combined with the individually ordered menu of the resident, gave the amount of food that the residents received. The leftovers of all meal components were weighed. During the night, nurses noted if a resident consumed some snacks or drinks. The obtained dietary data were converted into energy, macro-, and micronutrients by using a VBS food calculation system (BAS nutrition software), a computerized version of the Dutch food composition table 2001.¹⁵

The Recommended Dietary Allowances (RDA) of the Health Council of the Netherlands was used as dietary references. In practice an intake less than 2/3 of the RDA was judged as a too low intake.¹⁶ These reference values are similar to the American RDA.

Mini Nutritional Assessment® (MNA®)

We used the MNA as an assessment tool to identify residents at risk of malnutrition.^{9 10} This questionnaire consists of 18 questions, classified in:

- ❖ Anthropometric assessment: weight loss, BMI, mid upper arm circumference and calf circumference
- ❖ General assessment: 6 questions related to lifestyle, medication and mobility
- ❖ Dietary questionnaire: 8 questions related to number of meals, food and fluid intake, and autonomy of feeding
- ❖ Subjective assessment: self perception of health and nutrition

The obtained maximum MNA-score is 30 points. A total score of < 17 points indicates existing malnutrition; a score between 17-23.5 points indicates risk of malnutrition while a score of > 23.5 points indicates a satisfactory nutritional status. The MNA assessment was performed as indicated by the MNA clinical practice user guide. The Dutch version of the MNA was used.

Body weight

We used mechanical sitting weighing scales (Seca, to the nearest 0.2 kg), a digital sitting scale (cormier type F.H. to the nearest 0.1 kg), and digital lifts with weighing device (UWE CCS – 150 K, Arjo Move, Arjo Maxi Move, and TR-Care, to the nearest 0.1 kg) to measure body weight. All weighing scales were calibrated one hour before measurement by putting a standard 60 kg on the scales. Body weight was corrected when scales were deviant. The nurses measured the body weight of the residents in the presence of the researcher (KN). Body weight was measured between 2.00 pm and 4.00 pm and after voiding. The residents were wearing normal clothing without cardigan and shoes.

Biochemical health indicators

Fasting blood samples were taken to measure haemoglobin (mmol/l), leukocyte (mmol/l), haematocrit (l/l) and total homocysteine (mmol/l) concentrations. The blood samples for the determination of haemoglobin, leucocyte and heamocrit were collected in a 3ml EDTA tube. The blood samples were placed in a closed box to protect the samples for daylight and analysed at the same day of extraction on a Technicon haematology H1 analyser (Technicon Instruments Co., Tarrytown, NY, USA). The blood sample for total homocysteine concentrations were collected in a 5ml EDTA tube and immediately placed on ice-water and were centrifuged at 2600 rpm for 10 minutes at 4° C within 30 minutes of collection. All plasma samples were stored at -80° C until determination.

Statistical analyses

The results are presented as mean \pm standard deviation and as percentage of individuals. The results classified by MNA-score are expressed in median values. Normality of the distributions of the variables was tested by the Kolmogorov-Smirnov test.

To test the differences between risk groups of malnutrition based on the MNA at one hand and dietary intake and biochemistry at the other hand, statistical analyses were performed by analysis of variance and the Kruskal-Wallis test. The significance level was set at 0.05. The statistical analysis was carried out with SAS 9.1.

RESULTS

In total 250 residents were willing to participate. We had to exclude 5 residents, because one was comatose, two were declared terminally ill and two switched over to parenteral nutrition in the period after they gave their consent. During the observation period 3 residents withdrew their consent. Of the 242 residents, 94 (39%) were male. Residents' baseline characteristics are presented in table 1. The residents were classified in the three classes of the MNA. Based on this classification, 15.8% of the residents were malnourished, 62.2% were at risk for

malnutrition and 22 % were well nourished. These residents were different in body weight and BMI, which are a part of the MNA. Mean age, length of stay, and number of diseases were similar in the three MNA-groups(**Table 1**).

The biochemical indicators (**Table 2**) showed that 58 % of the male residents had a low status of haemoglobin (8.2 mmol/l), 55% had a low status of hematocrit (0.391 l/l), 14% had an elevated leucocyt status (8.1 mmol/l) and 32 % had an elevated total homocysteine status (17.2 mmol/l). Within the female residents, 35% had a low status of haemoglobin (7.8 mmol/l), 32% had a low status of hematocrit (0.37 l/l), 11% had an elevated leucocyt status (7.3 mmol/l) and 43 % had an elevated total homocysteine status (16.6 mmol/l).

Mean energy intake (table 4) was 6061 kJ, there was no significant difference in energy intake between the three MNA groups ($p = 0.17$). More than 35% of the residents had an energy intake below 2/3 of the RDA. The caloric profile of the diet was adequate (17 en% proteins, 32 en% fat and 51 en% carbohydrate) and showed a relative low fat intake. Mean intake of proteins was sufficient with 58g/d but 10 % of the residents had a lower intake than the RDA. There was no statistical difference between the three MNA-groups with respect to protein intake. Fifteen percent of the residents had a protein intake expressed as g / kg body weight lower than the 2/3 of the RDA (0.53g). Total fat intake was 53g and was different ($p=0.0036$) between the three MNA-groups with the lowest intake in the malnourished group.

A high percentage of residents had insufficient ($<2/3$ RDA) intakes of retinol ($\text{♂}50\%$ and $\text{♀}40\%$), vitamin B1 (39%), vitamin B6 ($\text{♂}64\%$ and $\text{♀}45\%$), Folic acid (86%), Niacin (52% and 43%), vitamin C (18%), vitamin D (96%), and vitamin E ($\text{♂}20\%$ and $\text{♀}15\%$) (table5). There were no statistical differences between the three MNA-groups for the vitamin intake.

Also, high percentages of residents were observed with insufficient ($<2/3$ RDA) intakes for calcium (44%), iron (33%), magnesium (59%), and zinc (37%). There were no statistical differences between the three MNA-groups for the mineral intake.

According to the food based dietary guidelines the mean intake of food was too low for the following groups: bread, fruit, vegetables and beverages. The MNA data on food group intake were qualitative and predict these low intakes except for beverages (data not shown).

Table 1. Characteristics of Dutch nursing home residents classified by the nutritional status according to the MNA

	TOTAL (SD)	MALNOURISHED MNA < 17	RISK OF MALNUTRITION 17 < MNA < 23.5	WELL- NOURISHED MNA ≥ 24	P-VALUES
N (%)	242	41(15.8)	147(62.2)	54 (22)	
MEAN (SD)					
Age (years)	77 (10.2)	81	78	79	0.24
Stay duration (months)	35 (50.7)	20	19	16	0.65
Body weight (kg)	73 (16.1)	59	71	76	< 0.0001
BMI (kg/m ²)	28 (6.9)	22	28	29	0.0001
Diseases (number)	3 (1.5)	3.4	3.2	2.7	0.09
Mini Nutritional Assessment (score 0 – 30)	20 (4.1)	15	21.5	24.5	
PROPORTION					
Dietary supplements	20	21	21	15	0.162
Dental status					0.108
Own teeth	12	8	15	4	
Partial dentures	8	5	8	7	
Complete dentures	72	70	67	85	
Edentulous	8	14	8	4	
Stroke	51	48	50	57	0.633
No psychological problems (MNA)	57	28	56	77	<0.001
Bedsore (MNA)	32	48	36	11	<0.001
Wheel chaired	75	95	78	53	<0.001

Table 2. Mean (sd) overall biochemical health indicators and biochemical health indicator in Dutch nursing home residents classified by MNA-categories.

	MEAN (SD)	REFERENCE VALUES	%< MINIMUM	MALNOURISHED	RISK OF MALNUTRITION	WELL-NOURISHED	P-VALUE
MALE							
N				16	60	21	
Hemoglobin (mmol/l)	8.2 (1.2)	(8.5-11.0)	58	7.3 (1.3)	8.4 (1.2)	8.4 (0.8)	0.022
Leukocyt (mmol/l)	8.1 (2.5)	(4-10)	14 [#]	11.8 (5.4)	7.7 (1.8)	7.5 (1.5)	0.028
Hematocrit (l/l)	0.39 (0.05)	(0.41-0.51)	55	0.35 (0.06)	0.41 (0.05)	0.41 (0.04)	0.026
Total Homocystein (mmol/l)	17.2 (8.1)	(>17.4)*	31 [#]	14.6 (6.2)	17.9 (8.7)	15.8 (5.9)	0.368
FEMALE							
N				25	87	33	
Hemoglobin (mmol/l)	7.8 (1.1)	(7.5-9.5)	35	7.9 (0.8)	7.6 (1.1)	8.3 (0.9)	0.003
Leukocyt (mmol/l)	7.3 (1.3)	(4.0-10.0)	11 [#]	7.9 (2.4)	7.4 (2.4)	6.6 (1.7)	0.087
Hematocrit (l/l)	0.37 (0.04)	(0.36-0.46)	32	0.38 (0.04)	0.37 (0.05)	0.40 (0.04)	0.005
Total Homocystein (mmol/l)	16.6 (7.5)	(>15.2)*	43 [#]	20.3 (9.1)	16.4 (7.6)	14.8 (4.8)	0.057

*cut off points of the Dutch Heart Foundation, which are similar of the ranges of the NHANES II. [#] Above the reference value

Table 3. Mean (sd) macronutrients intake in Dutch nursing home residents classified by MNA-categories and proportions < 2/3 RDA¹⁾

MACRONUTRIENT	MALNOURISHED		RISK OF MALNUTRITION		WELL-NOURISHED		% <2/3 RDA	RDA
N (%)	40 (15.8)	54 (22)	153 (62.2)	6179 (1364)	35	8800-7800		
Energy intake (kJ/d)	5590 (1825)	59 (15)	6142 (1486)	59 (15)	10	60-51		
Total protein (g/d)	53 (20)	16.4 (2.4)	16.4 (2.4)	16.1 (2.3)	1.6	11		
Protein (en%/d)	0.90 (0.36)	0.82 (0.25)	0.82 (0.25)	0.75 (0.21)	14	0.79		
Protein / bodyweight (g/kg/d)	45 (16)	53 (16)	53 (16)	57 (16)	-	-		
Total fat (g/d)	29.3 (4.6)	32 (5.6)	32 (5.6)	34.2 (4.9)	8.5	30-35		
Fat (en%/d)	176 (59)	181 (49)	181 (49)	176 (41)	-	-		
Total carbohydrate (g/d)	54.2 (5.6)	50.7 (6.7)	50.7 (6.7)	48.8 (5.6)	1.6	55		
Carbohydrate (en%/d)	11 (6)	13 (5)	13 (5)	15 (5)	-	-		
Dietary fibre (g/d)								

¹⁾ The Recommended Dietary Allowances (RDA) of the Health Council of the Netherlands was used as dietary references. These reference values are almost similar to the American RDA.

Table 4. Mean (sd) micronutrients intake in Dutch nursing home residents classified by MNA-categories and proportions < 2/3 RDA¹⁾

MICRONUTRIENT	MALNOURISHED	RISK OF MALNUTRITION	WELL-NOURISHED	% <2/3 RDA	RDA
Retinol (mcg)	742 (574)	752 (431)	724 (382)	45	1000-800
Beta-carotene (mcg)	1047 (860)	1179 (1013)	1276 (785)		
B1 (mg)	0.98 (0.6)	0.89 (0.3)	0.86 (0.4)	39	1.1
B2 (mg)	1.5 (0.9)	1.5 (0.5)	1.3 (0.5)	7	1.5-1.1
B6 (mg)	1.2 (0.8)	1.6 (0.5)	1.1 (0.3)	45	1.8-1.5
B12 (mg)	3.7 (2.5)	3.9 (1.9)	3.4 (1.3)	7	2.8
Folic acid (mcg)	157.0 (125)	142 (64)	132 (43)	86	300
Niacin (mg)	12.4 (12.8)	17.9 (53.0)	9.1 (2.6)	43	17-13
C (mg)	76 (45)	77 (50)	79 (35)	19	60
D (mcg)	3.4 (2.7)	3.1 (1.6)	3.0 (1.3)	97	15
E (mg)	10.5 (8.8)	10.7 (14.3)	9.9 (4.8)	15	10-8

Table 5. :Mean (sd) mineral intake in Dutch nursing home residents classified by MNA-categories and proportions < 2/3 RDA¹⁾

MINERAL	MALNOURISHED	RISK OF MALNUTRITION	WELL-NOURISHED	% <2/3 RDA	RDA
Calcium (mg)	923 (523)	928 (365)	853 (340)	44	1200
Iron (mg)	8.6 (5.4)	7.9 (2.7)	7.7 (2.0)	34	10
Kalium / Potassium (mg)	2194 (880)	2550 (769)	2541 (624)	-	-
Magnesium (mg)	210 (107)	224 (65)	220 (54)	59	350
Zinc (mg)	8.2 (5.2)	7.8 (2.8)	7.3 (2.2)	37	10
Copper (mg)	0.83 (0.6)	0.83 (0.7)	0.88 (0.6)	10	0.7 – 0.6

¹⁾ The Recommended Dietary Allowances (RDA) of the Health Council of the Netherlands was used as dietary references. These reference values are similar to the American RDA.

Table 6. : Median (Q1-Q3) intake per food group in gram in Dutch nursing home residents

	N	MEDIAN (Q1-Q3)	RECOMMENDED AMOUNT¹⁾
Total	247		
Bread	226	74 (53-106)	140
Cheese	167	20 (10-31)	20
Fruit	221	86 (50-136)	250
Milk	240	371 (213-515)	350
Potatoes	229	62 (35-95)	100
Cereals and flours	39	35 (22-48)	50
Vegetables	235	68 (40-102)	100-150
Meat	236	67 (48-88)	75 [#]
Fish	51	32 (26-43)	75 [#]
Egg	91	16 (9-16)	100 [#]
Beverages	240	800 (625-980)	1250
Soup	178	133 (78-196)	
Nuts	109	20 (8-21)	-**
Mixed meals	105	64 (40-100)	-
Cake	212	16 (8-35)	-
Preperaten	63	66 (17-200)	-
Sugar	218	21 (11-38)	-
Fat, oils and sauces	238	40 (27-52)	-

** - no recommendations ¹⁾ These amounts are guidelines of the Netherlands Nutrition Centre for an adequate and healthy diet.

DISCUSSION

The results of this study show that intake of energy (6101 kJ) and micronutrients are insufficient

There was no significant difference in intake between the three MNA categories, although anthropometrical data demonstrated clear differences between the groups. Insufficient intake of vitamins B1, B6, folic acid and vitamin D is reflected in a high homocysteine serum level. Food group intake data showed that they had sufficient intakes of dairy products, potatoes, cereals and meat (proteins), but an insufficient intake of vegetables, fruit, bread and beverages. The MNA food groups' items indicated also these insufficient intakes, except for beverages.

The observed daily energy intake (5590-6179kJ) is similar to other Dutch studies as well as to data of international studies.^{13 17-19} Still these observed intakes are too low to supply a diet with adequate micronutrient content. Earlier studies have demonstrated that food intake decreases with aging, and that with energy intakes below 6300 kJ it is very difficult to obtain an adequate dietary micronutrient supply.¹⁸ Most dietary assessment methods, however, underestimate intake. In this study we applied an observed record method, which in a validation study showed only a 5% of energy intake underestimation, if the energy intake and expenditure are in balance.²⁰

For adequate estimations of the energy and nutrient intake, we used the observation and weighing-back method to assess daily energy intake instead of estimations like self reports.¹² Calculating the mean daily intake of three days of each resident reduced the effect of the day-to-day variation of energy intake.¹² Within each nursing home the same dieticians performed the observation. During two days the dieticians were trained in weighing and estimating amounts of food and how to code the obtained data. To lower the influence of the observation on the normal eating behavior of the residents, measurements of the content of all used household units were performed one day prior to the energy intake observation. Towards the residents, the dieticians were presented as researchers to prevent that residents felt restricted in their eating behavior.

Based on the MNA, 78 % of these residents is 'at risk' or are malnourished. On first sight this seems to be higher than in an earlier Dutch study and previous international research which used the MNA as nutritional parameter.^{13 21-23} Yet, some authors used a single focus parameter (weight loss) which narrowed the definition of malnutrition. Other authors applied extensive exclusion criteria and therefore had a higher proportion of healthier residents in their research population. Our high number of residents who are malnourished is similar to studies that included all residents living on the ward and with studies which also included residents with dementia.^{5 24}

All three MNA categories had a low energy intake, but we did not observe a significant difference between the well-nourished and (at risk) malnourished group in this study. This might be due to the small difference of the mean MNA score between the 'at risk' (21.5) and well-nourished (24.5) category. The difference in mean MNA score in research done by Vellas et al. was higher and possibly therefore it showed significant differences in energy intake between the three groups.⁹ The low energy intake of the well-nourished residents might indicate that

these residents on short term will move from the well-nourished category to the 'at risk' category. Therefore our results indicate that it is important to monitor the nutritional status among nursing home residents on regular basis. A recent study showed that this easily could be done by a simple appetite questionnaire which predicts weight loss in nursing home residents.²⁵

A limitation of our research is that we only included residents living in long stay wards with a chronic somatic disease. Therefore, residents with dementia were excluded. These residents are even more vulnerable for malnutrition, because of other problems leading to a low food intake such as paranoia, food denial, and agitation.²⁴ It is possible that their energy intakes would be even lower than the intake in our population. Therefore, we expect that if psycho-geriatric residents had been included, the amount of malnutrition would have been even higher.^{19 24}

This study and many indications from other studies stress that we can no longer assume that malnutrition is only a problem for terminally ill and demented nursing homes residents. Structural changes and adequate intervention are needed to make dietary changes (e.g., extra snacks, fortified food, liberalization of diet prescriptions, intervention with feeding assistance, providing more interesting foods, stimulating food services).^{17 26} Therefore it is recommended that each nursing home resident has an individualized nutrition plan, which describes residents' food preferences and wishes and includes structural nutritional monitor moments by professionals.^{27 28}

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CHAPTER 3: PROJECT STRATEGIES TO IMPROVE THE AMBIANCE DURING MEALTIMES

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In many Dutch nursing homes, meals are not served in a convivial and social setting. This study makes an inventory of projectmodels used in nursing homes to improve the ambiance during mealtimes and identifies the beneficial and impediment (barriers) factors of the meal ambiance models.

Three different meal ambiance project strategies were found: restaurant, cooking on the nursing ward and family style meals. Each of the three models was experienced as a success by the nursing home inhabitants, the nursing home management and the staff. They pointed out that the cooperation and motivation of staff, sufficiently sized space and management support were the most important beneficial factors of the strategies. The most important barriers of the strategies were absence of cooperation and motivation of the staff, insufficient finances and insufficient personnel.

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BACKGROUND

The nutritional status of many residents in Dutch nursing homes is precarious.^{1 2} Literature suggests that more than 50% of the residents have an insufficient intake of water-soluble vitamins (B vitamins and vitamin C) and that 30% at admission is malnourished.^{1 3} Malnutrition not only leads to unintentional weight loss but also to higher morbidity, higher mortality and a lower quality of life.⁴⁻⁷ Malnutrition is a generic term which encompasses weight loss and decrease of biological functions resulting from a lack of nutrients in general.⁸

Meals do not only satisfy our biological needs but also our psychosocial needs.⁹ Eating can be either very pleasant or very unpleasant. Having a meal in unpleasant social environment does not stimulate resident's appetite and might have a negative effect on food intake. Data from American and Dutch studies show that the intake of food during the meal will increase if there are more table companions and that the same meal will taste better in sociable environment than in unsociable ones.¹⁰⁻¹² Earlier research showed that residents with dementia are less irritated, anxious, agitated and depressed and increased their participation and communication during mealtimes when meals are served in a family-style atmosphere or music was played.¹³⁻¹⁶

In general meal serves in Dutch nursing homes lack a homelike and pleasant atmosphere during the meals.¹⁷ In 80 percent of the Dutch nursing homes meals are served in individually pre-plated services. Residents receive their entire meal on a tray and often their main course was served on a pre-divided plate. Depending on the resident's preference, they have their meal in a common dining room or in their own room. This meal services practice, in absence of a pleasant environment, does not stimulate residents' appetite and meal enjoyment.

Literature of best practices is scarce.¹⁸⁻²⁰ The few existing best practices express the importance of the role of nutrition assistants - the link between the resident, senior nurse and kitchen staff- and the advantages of a mobile kitchen in order to optimize the experience of taste and smell.¹⁹ In this way these nursing homes are trying to change mealtimes into a pleasant moment.²⁰ However, it is not yet clear under which conditions such projects are actually successful.

In a pilot study of 12 months we showed that improving the social and physical ambiance during the mealtime counteracted a decline of the reported quality of life and it increased body weight with 3.3 kgs of Dutch nursing home residents.²¹

The findings from the report of the health inspection, the scarce best practice examples and the promising results of Mathey et al. (2001) have been an inducement to make an inventory of existing mealtime ambiance strategies in Dutch nursing homes and to identify the accompanying incentives and barriers on the implementation of these strategies.

METHOD AND MATERIALS

The 'process or implementation analysis design' was used in this study to describe the different ambiance strategies and the incentives and barriers of the implementation of these strategies. This design is mainly aimed at describing the intervention and its implementation and a structured interview questionnaire was developed in line with this design.²²

We defined a mealtime ambiance strategies as projects that entail changes in the surroundings or atmosphere during mealtimes or changes in the manner of serving or staffing, all aimed at improving the atmosphere during mealtimes.

Recruitment of institutions

Datasets of Prismant ('Zorgvernieuwing' and 'Bejegening'), Arcares (multi-disciplinary study group fluids and food provision, Arcares, 2002), advertisement in Prismant Magazine (No. 4, January 2001, page 23) and references of colleagues and nursing home experts were used to trace nursing homes with a meal ambiance project.²³ More than 30 institutions with a possible mealtime ambiance project were identified. These institutions were screened for participation in the study by the following inclusion criteria: the project had started after 1995, it was still active, and the changes had been introduced as a project and not gradually throughout the years, all of which had to be proved in writing. Furthermore the institution was asked to participate in the study.

All institutions were visited by one researcher (KN). During these visits one person of (1) the management, (2) the nursing staff, (3) the hotel service staff and (4) client board, including the project leader was interviewed. It was also attempted to interview (5) three residents, directly involved in the project, per nursing home.

The interview

The interview was based on the principal that these five groups represent micro (resident / client), meso (staff) and macro (management) levels of food care in the institutions.^{23 24}

The interview consisted of a questionnaire based on related literature and had both open and closed questions.²⁵⁻²⁷ The questionnaire was submitted in several consecutive rounds to eleven experts all actively involved in research and policy in Dutch nursing homes. During these rounds the experts had to indicate if essential topics were missing and each separate question was judged on its content. The institutions received the questionnaire two weeks before the visit. Interviews were conducted on the basis of this questionnaire.

The five different groups had only to answer that part of the questionnaire that was directly relevant to their work. The general description and the parts about infrastructure, finance and staff policies were answered by the management. The questions about changes on the nursing ward during mealtimes were answered by nurses and nursing aids. The evaluation of the project, incentive and barriers and their advice were answered by all groups, with the exception of the residents. The evaluation by residents, consisting of 10 open questions, was answered by the residents themselves. Among other things, they were asked if they experienced meals as cosier and, if so, why. Also they were asked to mark the atmosphere during mealtimes with a number between 0 and 10.

Processing of results

Data were processed in frequency tables. The open questions, which allowed comments, led to qualitative data. These were used to clarify the quantitative results. In **Table 10** the answers of the residents were divided into categories and these were clarified with examples given by the residents.

RESULTS

Participating institutions

Of the 30 institutions with a mealtime ambiance project 14 dropped out after applying inclusion criteria. Eight homes did not meet the project related inclusion criteria; within three institutions the project was no longer active and the other five had introduced the changes gradually and not in project form. The other six homes did not give permission for the study. As regards to the ambiance strategy these 14 projects did not differ from the project strategies visited.

Projects

The 16 ambiance strategies could be divided into three types:

- ❖ The meals were served as in a restaurant (n=6). The residents did not eat in the nursing ward, but had their cooked meals in the restaurant. Presentation and service were comparable to a commercial restaurant.
- ❖ The meals were cooked together with the residents at the ward (n=4). The residents performed small household tasks, such as laying the table.
- ❖ The meals were served in dishes in a communal dining room (n=6). In most cases the surroundings were adapted to the serving of meals. The tables were laid with a tablecloth, napkins and a small flower arrangement and soft background music was playing. Cold meals were offered as a buffet. This ambiance strategy is called family style.

The two latter strategies are mostly combined with a rearrangement of the institutional day scheme and a more homelike atmosphere.

Table 7 presents the characteristics of the participating institutions and the number of people interviewed per discipline of each ambiance strategy. We included three assisted living facilities because there were not enough nursing homes with the restaurant strategy co-operating in the study.

Table 7. Nursing homes characteristics, and response per party involved and project category

	RESTAURANT N = 6	COOKING ON THE WARD N = 4	FAMILY STYLE MEALS N = 6
CHARACTERISTICS			
Size of institutions (bed)	±125	±200	±200
Number of wards	All	1	1
Somatic / psycho geriatrics	4/2	0/4	2/4
Nursing home / rest home	3/3	4/0	6/0
INTERVIEW GROUPS			
Management	6	4	5
Nurses	5	4	6
Hotel staff	4	4	5
Client board	2	2	5
Clients	10	0*	11

The general goals of the strategies can be divided into three categories:

- ❖ promoting the well being of the clients
- ❖ diminishing the institutional character of a nursing home and
- ❖ optimizing the established care and treatment

Goals

Three institutions with a restaurant, three institutions with family style meals and one institution that cooks on the ward indicated they fulfil their pre-set goals. Two homes with a restaurant attained their goals to a large extent. The restaurants need some extra decorations and the staff needs extra training.

Two family style meal projects also largely attained their goals. They are working on changing staff's attitude from an organizational oriented care toward a client oriented cares. The greater part of the goals was also attained by two homes with cooking on the ward. They still have to create an alternative for those days on which the planned menu cannot be executed because of circumstances.

One nursing home reported that it had only attained half of its pre-set goals of their cooking on the wards project, because of the negative attitude of the staff towards the new tasks. The staff's remarks were now first being investigated and the project would be fully introduced after application of suggestions in the project protocol.

One home with a living room ambiance project and one home with a restaurant project had not yet attained the pre-set timetable for evaluation.

Investments

Introducing mealtime ambiance projects entailed a number of investments in infrastructure, finance and staffing (**Table 8**).

Table 8. Investments to promote mealtime-ambiance in Dutch nursing homes

	RESTAURANT	COOKING ON THE WARD	FAMILY STYLE
New Housing	X		
Rebuilding	X	X	
Lost income	X		
Cooking facilities	X	X	
Other material	X	X	X
Extra staff	X	X	
Extra volunteers	X	X	X
Reorganisation of staff	X	X	
New job description	X	X	X

To open a restaurant in a nursing home investments had to be made to create a large enough area to accommodate all residents and the kitchen had to be adapted to an 'a la carte' system. Depending on (pre)existing infrastructure and material present these costs can run up quite high if building or rebuilding of the dining room is necessary (euro. 10.000 – 659.000). Also investments had to be made in

extra staffing for the kitchen (on average 1.5 fte per institution), extra volunteers for serving in the restaurants (on average 1.8 per day), reorganization of staff and their tasks. Furthermore a possible loss of income from a (temporary) stop of meals-on-wheels will have to be taken into account.

The strategy 'cooking on the nursing ward', needed special kitchen and cooking units on the nursing ward. This entailed the cost of purchase of these units, the cost of necessary rebuilding for their installation and the purchase of the required kitchen utensils (euro. 6.800 – 32.000). For the supervision during cooking two homes employed 1 fte extra personnel and two homes reshuffled tasks within the nursing team.

Family style meals projects required extra attention to a homelike presentation of the dining room. This project strategy required the purchase of table cloths, serving dishes, dinner-services and further material (euro. 450 – 9.000). No extra staff was employed. To guarantee enough personnel during meals reorganization of the nursing staff and a change in break times of the nursing teams was required.

Relocation of tasks in the three projects strategies means that the content of work was adapted for those employees. For example: restaurant employees take over tasks related to nutritional care from nursing staff and food assistants help restaurants employees in food serving and cleaning during meals.

Incentives and Barriers

When determining facilitating and impeding factors of the three types of projects the same items were often mentioned as incentives and barriers.

Co-operation and motivation by the staff, sufficient room and support from management were mentioned as general facilitating factors in all three project strategies.

In addition other factors were mentioned in each project strategy. Within 'the restaurant project' this was sufficient staff and sufficient material, within 'the cooking on the ward project' this was sufficient finance and within 'family style meals project' this was sufficient staff and adequate material.

In all three project strategies the following factors were considered most impeding: shortage of staff, lack of co-operation and motivation by the staff and shortage of finance. For 'the cooking on the ward project' shortage of materials and lack of space were also mentioned as impending factor and the for 'family style meals project' lack of space was mentioned as demotivating.

In **Table 9** the incentives and facilitating factors that are specifically linked to each of the groups interviewed; management, nursing staff, hotel staff and client board, are listed. Within each factor the number of times mentioned as 'very important' is listed.

All four groups mentioned co-operation and motivation of the staff, sufficient space and sufficient support by management as the three most important facilitating factors. The most important impeding factors differed somewhat between the four groups, concerning both the number of factors and the order of importance.

Table 9. Incentives and barriers mentioned by management team, nurses, facility staff and client board

	MANAGEMENT	NURSES	HOTEL STAFF	CLIENT BOARD
	N=12	N=12	N=11	N=4
INCENTIVES				
Assistance and motivation	11	11	11	4
Enough space	9	11	11	4
Management support	9	11	8	4
Financial budget	9	7	8	4
Client contact	9	11	6	2
Enough staff	6	11	9	3
Enough material	9	11	7	2
Cosy environment	7	10	9	4
Enough volunteers	5	3	11	3
BARRIERS				
Lack of space	2	4	2	2
Lack of staff	-	3	2	2
Lack of material	1	2	1	-
Lack of financial	-	2	1	1
HACCP	1	2	1	-
Lack of volunteers	-	1	-	2
No support of management	-	2	-	-
Unsuitable material	-	-	2	-

Evaluation of the projects

Of 16 institutions 13 indicated that a project evaluation had been carried out. Only five of them had a written project evaluation, which could be surveyed by the present investigator (KN). The 13 evaluations had been conducted on staff (12/13), residents (7/13), institution (6/13) and family (5/13) levels. One nursing home checked the effects on the residents' health.

The staff evaluation of this study shows that the reactions of those interviewed were generally positive. They were asked to mark the project with a number between 0 and 10. The average scores for the restaurant, living room ambiance and cooking on the ward projects were respectively 8, 7.8 and 7.8.

The interviewees were of the opinion that their residents had started eating more and that their quality of life had improved. Since no measurements had been made regarding well-being or nutritional status of their residents, these positive effects could not be verified, with the exception of one nursing home.²¹

Evaluation by the residents

In every participating institution it was attempted to interview three residents directly involved in a meal ambiance project. This could not be realized for the project strategy 'cooking on the ward', because this project strategy only occurred on psycho-geriatric wards, where the residents could not be interviewed.

All residents interviewed thought it was more enjoyable after the changes than before. This was induced by an increased social contact, the nice presentation of the food, the freedom of choice, the kind and helpful staff and peace and quietness during mealtimes. **Table 10** divides the various remarks into several categories and illustrates them with examples. The most frequent answer to the question “Why is it more enjoyable now?” was presentation of the meal for residents in the family style meals projects (7/11) and social contact for the residents in the restaurant project (10/10). The average mark for the family style meals project was 8.5 and for the restaurant project 8.3.

The residents also gave a number of tips for cosier meals, such as “the staff should keep up the conversation” and “stimulate residents to be kinder to each other”. Also smaller groups at table and soft music were made as suggestions. They expressed that they would not want to miss the freedom of choice and nice presentation any more. Freedom of choice gives them a sense of independence and nice presentation and service add to the feeling of cosiness.

Table 10. Beneficial factors mentioned by clients (n=21)

BENEFICIAL FACTORS:	
SOCIAL CONTACT	FREEDOM OF CHOICE
Chatting with table companion	To Order what you like
Seeing and meeting other residents	To order by you self
Making new friends	The extended choice of food
Eating in group is more enjoyable than eating alone	
AMBIANCE OF ENVIRONMENT	KINDNESS OF STAFF
The table napkins	The extra help
The way of serving the meals	The friendly personnel
The restaurant impression	The contact with the personnel
The music	The helpful personnel
QUIESCENCE	
Quietness	

DISCUSSION

Tracing nursing homes with a mealtime ambiance project resulted in 16 homes with three different project strategies: restaurant, cooking on the ward and family style meals. These were considered successful by residents, management and staff. The main incentives were good co-operation and motivation by the staff, sufficient space and support from the management. Lack of motivation and co-operation by the staff, insufficient financing and shortage of staff were mentioned as the main barriers. Only five out of sixteen institutions had conducted a formal evaluation of the implementation of the project.

Study of literature did not reveal previous publications on the number and various mealtime ambiance projects in the Netherlands or internationally. The three project strategies could not be expanded with other project strategies from literature. No other project strategy was acquired from the 14 institutions excluded. Literature and nursing home protocols did mention individual actions, such as the use of soft

music, limitation of sounds and distractions during meals and the use of encouragements to promote peace and quietness during meals and enhance appetite.^{13-16 28-31} Most of these actions have been integrated into the three project strategies, but it is also possible to apply them separately.

In contrast to what the main goal -‘promoting the well-being of residents’ -might suggest, most of the evaluations (12/13) took place on staff level. Only seven institutions had conducted an evaluation amongst residents and only one nursing home had examined food intake and quality of life. Of 13 institutions only five had done a written evaluation. Nevertheless the interviews showed that management was very positive about the extent to which pre-set goals had been attained. However this self reported positive image needs to be interpreted carefully.

The nursing homes were identified through a search of the dataset of Prismant and Arcares. These two institutions are acquainted with health care organizations on the one hand and policy makers on the other hand. Moreover an advertisement was placed into Prismant Magazine, which is freely distributed amongst all Dutch health care institutions. We found 30 institutions with a project. This indicates that in the Netherlands the importance of mealtime ambiance in food care is recognized to a certain extent. There are 330 nursing homes in the Netherlands, of which 20% of somatic nursing homes do not serve preportioned meals – according to the report of the health inspection. For a number of those this is related to the history of the institution or its residents (i.e. clergy) and others have introduced the changes gradually and not as a project, which excluded them from our study.

The written information criteria was used as proof for the implementation of the changes as a project. By having a clear starting point it is easier to show and communicate the implementation of the changes, the reactions and the effects on employees and residents. There is a sense of ‘before’ and ‘after’. The written information had to indicate which goals were being pursued, what changes had been introduced to attain them and the composition of the project group. Informal documents such as minutes were sufficient. Five of the pre-selected nursing homes did not have any written information. Main reason was that current mealtime ambiance had developed over a long period of time by means of small changes, without the pursuit of a greater goal. Therefore the necessary changes and their effects could not be investigated.

All projects were successful. This can be attributed to one of our inclusion criteria: the project still had to be practiced. Had there been non-successful projects, then they could have contributed to the impeding factors on the implementation of a project. Three institutions were found that had stopped their projects. They did not meet the inclusion criteria. The reasons for abandoning the projects were: costs running too high, nursing staff losing interest and fade throughout time. These reasons are consistent with the impeding factors found: absence of co-operation and motivation by the staff, shortage of finance and shortage of staff.

In general it can be concluded that there are three project strategies that have a positive influence on the ambiance during mealtimes and that all three of them are considered as a success. No verdict can be given as to which project strategy is the best; in our opinion that depends on the specific situation in the nursing home and its population. With a view to the finance and infrastructure required for restaurant and cooking on the ward projects, the family style meals project seems most feasible for the average Dutch nursing home. Before the introduction of an

ambiance project, we advise the initiators to make an inventory of specific wishes and needs of residents.

This study offers resources to improve the ambiance during mealtimes, which might stimulate the appetite and quality of life of nursing home residents. Residents attach great importance to social contact during meals and the presentation of the room in which they are having their meals. Also freedom of choice as to the menu is considered important. Many institutions have menu lists, which offer residents a choice between various components of the meal, but most of the time these lists are completed by family or nutritional assistants and this has to be done two or three weeks beforehand. By that time many residents will have forgotten what they had ordered or will not feel like eating what they had ordered on that day. Offering a choice on the day itself will prevent this.

Moreover this study exposes the facilitating and impeding factors, which can augment the chance of success of a mealtime ambiance project. Co-operation and motivation of the staff is a very important facilitating factor. It is not sufficient to simply inform them about the how and why of the changes. They should be given the opportunity to launch their own ideas on the set-up of the project, in order to come to a joint decision. It is essential that there are a number of advocates for the project from within the body of staff, who can inspire the rest with enthusiasm. After introduction of the project there should be continuous feedback between the various involved disciplines.

It is desirable to study the effect of these project strategies on food intake, weight and quality of life of the residents. The results of these studies can induce health policy makers to stimulate such initiatives.

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***CHAPTER 4: FAMILY STYLE
MEALS MAINTAIN THE QUALITY
OF LIFE, PHYSICAL
PERFORMANCE AND BODY
WEIGHT OF NURSING HOME
RESIDENTS:
A CLUSTER RANDOMIZED
CONTROLLED TRIAL***

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Context: Mealtime is one of the highlights in the daily routine of a nursing home. We hypothesized that family style dinners instead of tray service dinners improves quality of life.

Objective: To assess the impact of family style dinners on quality of life, physical performance and body weight of nursing home residents.

Design, Setting and Participants: In 2002 a cluster-randomized trial was conducted among 178 residents (mean age 77 years) in five Dutch nursing homes. Within each home, two wards were randomized in intervention (n=95) and control group (n=83).

Intervention: During six months the intervention group had their meals in family style, the control group received the usual individual pre-plating services.

Main Outcome Measures Outcome measures were quality of life (range: 0-100 units), gross and fine motor function (range: 0-24 units), and body weight. Quality of life comprised perceived safety, autonomy, sensory, physical, and psychosocial functioning.

Results The difference in change between groups was statistically significant for overall quality of life 6.1 units (95% Confidence interval, CI [2.1-10.3]), for fine motor function 1.8 units (95% CI [0.6- 3.0]) and body weight 1.5 kg, (95% CI [0.6 kg-2.4 kg]).

Conclusion: Family style meals maintain quality of life, physical performance and bodyweight of nursing home residents.

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INTRODUCTION

Residents of nursing homes are not only faced with physical deterioration but also with the loss of their independency, privacy, spouse, and familiar environment. These factors lead to high prevalence of loneliness and depression and to a low perceived quality of life.¹

The mealtime at nursing homes provides an excellent opportunity to integrate and implement physical care with various types of quality of life improving measures. Food and nutrition are essential components of “the good life”.² It might be a moment for socializing with other residents and staff, making personal choices according to one’s preferences, and under well organized circumstances a time of rest and peace. Thus, a warm and social mealtime environment might add a sense of security, meaning, order, and structure to the residents’ day and therefore improve their life satisfaction.^{2,3}

In a pilot study we showed that improving the social and physical ambiance during the mealtime counteracted a decline of the reported quality of life in Dutch nursing home residents.⁴ Residents with dementia are less irritated, anxious, agitated and depressed and increased their participation and communication during mealtimes when meals are served in a family-style atmosphere or music was played.⁵⁻⁷ All studies in this field are characterized by a very small sample size (n = 6 to 29).⁴⁻⁷ Therefore these results have to be interpreted cautiously and cannot be used for large scale implementations.

In most nursing homes meals are individually served on trays in a non-stimulating social environment and these meals provide task oriented care rather than resident oriented care.⁸ In our ‘meal ambiance project’ we offered the residents their meals in a family style dinner. We hypothesized that among the residents in the intervention group, quality of life, physical performance, and bodyweight during a six-month intervention period would remain stable, while these outcome measures would decline among the residents in the control group.

POPULATION AND METHODS

In most Dutch nursing homes there are two different types of care available: 1. psycho-geriatric care (dementia) or 2. chronic somatic care (stroke, Parkinson disease,...). These two groups of residents live on separated wards with an average of 30 residents per ward. A traditional ward has 3 or 4 single rooms, 4 or 6 double rooms and 4 dormitories for four-persons. Many Dutch nursing homes currently have planned major infrastructural reorganisations to offer each resident their own room and better care services. These services may include family style dinner services.

Residents and design

The nursing homes were recruited to participate in the “Ambiance project” by means of an advertisement and through a branch organisation. In total 53 nursing homes (NHs) expressed their interest. Eligibility criteria were:

- ❖ The NHs had to be medium sized (175-275 beds) with a general nursing home population.
- ❖ The NHs had to have two wards with residents with chronic somatic diseases (stroke, general malaise, osteoporosis, and neuropathy ed.) and long term care or permanent stay.
- ❖ The NHs had to be located in different parts of the country.
- ❖ The eligible wards had to be similar in staff numbers, disciplines, and education levels, in newness infrastructure, in location and residents' activities.

Sixteen NHs met the eligibility criteria, six of them were willing to cooperate and five did actually implement the project. Ten chronic somatic wards participated in the study, each with their own dining area. In each nursing home there was a control and intervention ward.

To blind the allocation of the trial wards, we did not visit the wards nor had any contact with the staff and residents, before allocation. The ward with the name of which the initial letter occurred as the first in the alphabet became the 'intervention ward'. The admission of subjects to wards was independent of the name of the ward. Only after this procedure the researchers visited the wards and their personnel.

The nursing home staff contacted the residents. A total of 282 residents were recruited from these five Dutch nursing homes. The residents received an information brochure of the purpose and the protocol of the study. Residents were excluded when they were in a terminal phase of a disease, had total parenteral feeding or were not able to give informed consent due to their physical or mental condition. (fig1) New residents entered the wards based on vacancy of beds and could not choose on which ward they wanted to life.

The majority of our study population was totally dependent for bathing and dressing, were functionally impaired in the activities transferring from bed or chair, feeding and toilet use, and had incontinence problems.

The ethical committee of the nursing homes and the medical ethical committee of Wageningen University approved the study protocol.

The intervention program

The intervention program lasted for six months. The program consisted of five aspects: table dressing, food services, staff protocol, residents' protocol, and mealtime protocol. (see **Table 11**) Non-participating residents of the intervention group were given the same meal services as those in the study.

The control wards maintained the individual pre-plating service in which the residents had to choose their menus two weeks beforehand. Likewise the intervention group, these residents had their meals on communal dining area of the ward. The dining areas of the trial wards were separated from each other.

In each nursing home a strictly standardized implementation procedure was followed. There were no 'ward' staff members who served both the intervention and the control ward.

Table 11. Intervention description

	FAMILY STYLE	USUAL INDIVIDUALLY PRE-PLATING SERVICES
TABLES	<ul style="list-style-type: none"> ▪ Tablecloth ▪ Drinking glass (no plastic cups) ▪ Normal plates ▪ Napkins ▪ Full cutlery ▪ Subtle flower arrangements 	<ul style="list-style-type: none"> ▪ Blank table ▪ Plastic cup ▪ Pre-designed plate, divided into 3 sections ▪ Everyone an bib on
FOOD SERVICES	<ul style="list-style-type: none"> ▪ The cooked meal is served in dishes on the table. ▪ Menu choice between two types of vegetables, meat and staple foods. ▪ During breakfast and supper no ready-to-eat sandwiches. 	<ul style="list-style-type: none"> ▪ The cooked meal is served on individually pre-plating tray. ▪ Residents chose their menu two week before hand. ▪ During breakfast and supper ready-to-eat sandwiches.
STAFF PROTOCOL	<ul style="list-style-type: none"> ▪ Staff sit down at tables and chat with the residents. ▪ Min. 1 nurse / nutrition assistant / volunteer per table. ▪ Medication is handed out before the start of the meal. ▪ There is no staff switch during mealtimes. ▪ Directly after the meal, when everyone has finished, the dining room will be tidied up. 	<ul style="list-style-type: none"> ▪ Staff did not sit down. ▪ Two staff members handout the individually pre-plated trays. ▪ Another staff member hands out the medication and one staff member helped residents who preferred to stay at their room. ▪ Family and volunteers sit down with residents they preferred. ▪ Staff leaves for lunch when they think nobody needs help ▪ As soon as residents finished their meal the tray is put away. ▪ Residents who finished their meal early are helped to the toilets or are leaving the dinning room.

FAMILY STYLE	USUAL INDIVIDUALLY PRE-PLATING SERVICES
RESIDENTS	<ul style="list-style-type: none"> ▪ Seats are assigned based on availability.
PROTOCOL	<ul style="list-style-type: none"> ▪ In a typical situation 6 residents sit at a table. ▪ Residents cannot change their minds if they dislike the food being offered.
	<ul style="list-style-type: none"> ▪ Balanced table dining groups of residents.
	<ul style="list-style-type: none"> ▪ In a typical situation 6 residents sit at a table.
	<ul style="list-style-type: none"> ▪ The residents make up their mind when food is served.
	<ul style="list-style-type: none"> ▪ Most residents can serve themselves with some help of a nurse or their table companion.
	<ul style="list-style-type: none"> ▪ Mealtimes starts when everybody sits down at tables
	<ul style="list-style-type: none"> ▪ Before mealtime there is a moment for reflection/prayer
	<ul style="list-style-type: none"> ▪ Mealtime starts when the trays arrive on the ward.
	<ul style="list-style-type: none"> ▪ Residents can hold their own moment of reflection/prayer.
MEALTIME	<ul style="list-style-type: none"> ▪ During mealtime a diversity of activities takes place: cleaning, doctor visits, laundry arrives,...
PROTOCOL	<ul style="list-style-type: none"> ▪ Family and friends walk in and out the dining room and disturb other residents.
	<ul style="list-style-type: none"> ▪ No other activities (cleaning, visits from doctor...) during mealtime.
	<ul style="list-style-type: none"> ▪ The dining room is closed during mealtime for visitors and health care providers. Exception: Observation by Health care giver during mealtime is necessary or visitors help the residents. In both cases, they have to be in the room at the start of the mealtime and remain until the end.
	<ul style="list-style-type: none"> ▪ Meal, drug and resident files cartridges have to be out of sight of the residents

Demographic and life style data

Information on sex, age, length of stay, number of drugs, number of diseases and dietary supplements were collected from the nursing files of the residents. Nutritional status was assessed by the MNA[®]. The MNA is developed and validated especially to evaluate the risk of malnutrition.⁹ It classifies nutritional status into three categories: Malnourished, risk of malnutrition and well-nourished. The height of residents was measured by the knee-to-floor height (KFH). Body height was derived using the following formula: height (in cm)=3.16*KFH (in cm).¹⁰

Outcome measurements

Although the intervention program was implemented on ward level, outcome measures were measured at individual level.

Quality of life

Quality of life was assessed by the validated Dutch Quality of Life of Somatic Nursing Home Residents Questionnaire in a face-to-face interview.¹¹ This questionnaire consists of five subscales: sensory functioning; focused on pain¹², physical functioning: on perceived self-care performance¹³, psychosocial functioning; on depressive or loneliness feelings¹⁴, perceived autonomy; on freedom of movement¹¹ and perceived safety; on feeling at home in the institution¹¹. Each of these subscales presents a quality of life dimension. The number of statements of the 5 subscales is not equal. In total, the questionnaire consists of fifty statements that were scored on a dichotomous scale (yes or no). Each subscale and the total questionnaire could be computed to a range of 0 – 100 by multiplying with a factor of 100 divide by number of statements. A high score of quality of life questionnaire means a high quality of life. The internal consistency was measured by using the Kuder-Richardson formula 20 (KR-20), a Chronbach's alpha for dichotomous items. The KR20 coefficients for each of the domains of the quality of life questionnaire in this study are: Sensory functioning: 0.72, Physical functioning: 0.80, Psychosocial functioning: 0.75, Perceived autonomy: 0.56, Perceived safety: 0.62 and Quality of life (total): 0.79. We consider this to be satisfactory within the context of this study.¹¹ A trained fieldworker read out the statements and marked the answers of the residents. The interview was conducted in a separated room of the residents' wards.

Physical performance

We used the Nursing Home Physical Performance Test (NHPPT) to assess physical performance.¹⁵ The NHPPT is designed and validated among nursing home residents who do not have end-stage dementia. The residents had to perform six tasks, which could be classified in gross and fine motor functions. The gross motor function tasks were: change from sitting to standing position, putting on/taking off a sweater, and walking or wheeling six meters. The fine motor functions were scooping applesauce, face washing and dial a telephone. The performance of each of the 6 tasks was assessed on speed (0 - 4) and assistance level (0 - 4). The score for each task could vary between 0 and 8, with a minimal score of 0 and a maximal score of 24 for both motor functions. The total score ranged from 0 to 48. A higher score means a better physical performance.

Body Weight

We used mechanical sitting weighing scales (Seca, to the nearest 0.2 kg), a digital sitting scale (Cormier type F.H. to the nearest 0.1 kg), and digital lifts with weighing device (UWE CCS – 150 K, Arjo Move, Arjo Maxi Move, and TR-Care, to the nearest 0.1 kg) to measure body weight. Body weight was measured between 2.00 pm and 4.00 pm and after residents' toilet visits. The residents were wearing normal clothing without cardigan and shoes.

Energy intake

Trained project dieticians measured food intake with the observation and weighing-back method during three 'working-days' before and after the intervention. An observation day started at 6.00 AM and ended at 10.00 PM. All foods and drinks consumed by the residents during three days were recorded.

Statistical analyses

The sample size was computed on the basis of a 6- point difference for quality of life score and taking into account intra-correlation coefficient (ICC) and the associated design effects.^{16 17} A sample size of 60 in each group was needed to achieve a significant difference at level 5% with 90 % statistical power for a two-tailed type I error for the primary outcome quality of life. We expected a mean drop out rate of 50%.^{11 18} Therefore we multiplied the sample size (60) for each group by 2. The total number of residents in each group at the start of the study had to be 120.

Because the allocation procedure was performed on the level of ward (cluster) we had to take into account that the outcome measures within the same ward were not independent from each other.^{16 17} This was done by the use of a proc mixed model with a random intercept for wards.¹⁷ Based on the intra class correlation coefficients of quality of life (0.0009), physical performance (0.006) and body weight (0.007) the main factor 'ward' contributed to the variance in scores of quality of life (1%), physical performance (10%) and bodyweight (12%). Thus, the impact of ward was limited.

Data analyses were performed with and without adjustments. Adjustments were made for age, length of stay and sex, because residents in the intervention group were older, had a shorter length of stay and comprised more females than the control group (see table2). In further analysis the variable nursing home turned out to be a confounder, therefore all outcome measures were also adjusted for the effect of nursing home.

Statistical analyses were carried out using the SAS / V8 system (SAS institute Inc., Cary, NC, USA).

RESULTS

Residents' baseline characteristics

Of the 282 residents who we invited to participate 250 took part in the study. We excluded 5 residents, because one was subcomateus, two were declared terminally ill and two switched over to parenteral nutrition in the period after they gave their consent. During the research period 34 residents died, 11 moved to another institution or nursing ward, 19 were discharged, and 3 residents withdrew their

consent. 178 residents completed the study. The intervention group consisted of 95 residents and the control group of 83 residents (see **Fig 1**). The residents, who did not complete the study, were similar in demographic and baseline outcomes from those who completed the study. Residents' baseline characteristics are presented in **Table 12**.

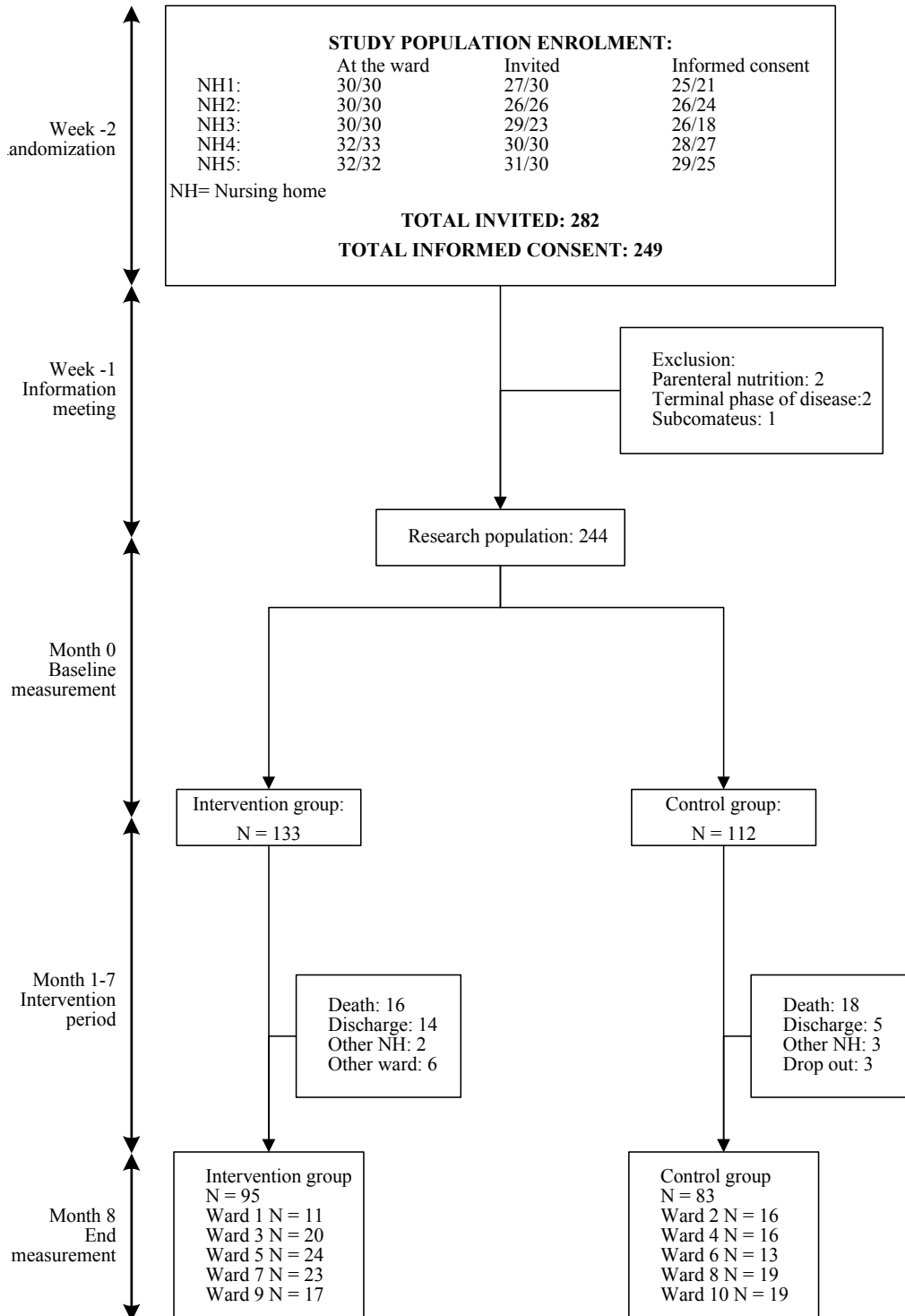


Fig 1. Flow diagram of the recruitment and retention of participants

Table 12. Baseline characteristics of the intervention group and control group

	INTERVENTION (N = 95)	CONTROL (N = 83)
MEAN (SD)		
Age (years)	78 (11.1)	75 (9.9)
Median (Q1-Q3) length of stay (months)	23 (12-48)	32 (9-52)
BMI (kg/m ²)	28.7 (6.8)	28.4 (5.8)
Numbers of drugs	7 (3.3)	7 (3.2)
Number of diseases	3 (1.4)	3 (1.6)
Quality of Life (0-100)	60 (13.4)	59 (13.5)
Body weight (kg)	73 (16.5)	74 (16.1)
PROPORTION (%)		
Female	70	55
Stroke	54	42
In wheelchair	78	86
Malnourished (MNA \leq 17) [#]	22	15
Dietary supplements	25	18

[#] MNA= Mini Nutritional Assessment (0-30)

Outcome measures

The difference in changes in quality of life between both groups was statistically significant different (CI 95% [2.1-10.3]) (see **Table 13**). The intervention group remained stable (+0.4) while the control group declined (-5.0). This difference in change was also seen in physical functioning (CI 95% [0.8-9.4]), psychosocial functioning (CI 95% [1.6-13.1]), and perceived safety (CI 95 % [4.3-28.9]). The changes within the groups for sensory functioning (CI 95% [-1.7-8.9]) and perceived autonomy (CI 95% [-1.4-5.7]) were not different from each other.

Regarding physical performance we observed that the intervention group had stable scores (+0.2), while scores declined significantly (-2.2, CI 95% [-4.0-(-0.4)]) in the control group. The difference in change was mainly found in the subscale fine motor function (CI 95% [0.6-3.0]), where the scores of controls declined significantly (-2.1, CI 95% [-2.6-(-1.5)]). Within the fine motor function, the control group needed more help by applesauce scooping (p= 0.007), washing their face (p=0.02) and dial a phone (p<0.001) than the intervention group. There were no statistically significant changes in the gross motor function scores.

Mean body weight remained relatively stable in the intervention group (+0.5 kg), while body weight decreased significantly in the control group (-1.1 kg, CI 95% [-1.9-(-0.2)]). Changes in weight between control and intervention group were significantly (CI 95% [0.6-2.4]) different.

Mean energy intake significantly increased in the intervention group (+481 kJ, CI 95% [84-878]), while energy intake decreased significantly in the control group (-420 kJ, CI 95% [-713-(-127)]). Changes in energy intake between control and intervention group were significantly (CI 95% [504-1479]) different.

The reported adjusted estimates and confidence intervals were similar to the unadjusted estimates and CI.

Table 13. Mean (sd) results at baseline and changes [CI] within and between intervention and control group for quality of life, physical performance and weight.

	INTERVENTION (N=95)			CONTROL (N=83)			ESTIMATE β Δ IN- Δ CO ¹	
	Baseline (sd)	β [CI 95%]	Baseline (sd)	β [CI 95%]	Unadjusted	Adjusted ² [CI 95%]		
Quality of life (0-100 units)	60 (13.4)	+0.4 [-1.8-2.5]	59 (13.6)	-5.0 [-9.4-(-0.6)]	5.4	6.1 [2.1-10.3]		
Sensory functioning	85 (20.5)	-2 [-5.4-1.59]	84 (21.2)	-4.7 [-10.7-1.4]	2.7	3.6 [-1.7-8.9]		
Physical functioning	40 (24.5)	-0.4 [-2.6-1.8]	38 (18.1)	-3.4 [-8.9-2.1]	3.0	5.1 [0.8-9.4]		
Psychosocial functioning	57 (22.1)	+2.9 [-1.2-7.2]	55 (21.9)	-6.2 [-10.7-(-1.8)]	8.8	7.3 [1.6-13.1]		
Perceived Safety	70 (30.2)	+5.8 [-10.2-7.1]	78 (26.5)	-8.7 [-17.2-(-0.2)]	14.4	16.6 [4.3-28.9]		
Perceived Autonomy	90 (19.7)	-1.6 [-10.2-7.1]	92 (19.1)	-3.9 [-10.9-3.1]	2.3	2.1[-1.4-5.7]		
Physical performance (0-48 units)	25 (12.3)	+0.2 [-2.3-2.7]	24 (12.3)	-2.2 [-4.1-(-0.4)]	2.4	3.2 [0.9-5.5]		
Gross motor function (0-24 units)	7.8 (7.8)	+0.7 [-1.1-2.5]	7.7 (7.1)	-0.1 [-1.7-1.5]	0.8	1.3 [-0.6-3.3]		
Fine motor function (0-24 units)	17.7 (6.4)	-0.5 [-1.6-0.7]	16.4 (6.9)	-2.1 [-2.6-(-1.5)]	1.6	1.8 [0.6-3.0]		
Body weight (kg)	73.8 (16.5)	+0.5 [-0.3-1.2]	74.6 (16)	-1.1 [-1.9-(-0.2)]	1.5	1.5 [0.6-2.4]		
Energy (kJ)	5979 (139)	+481 [84-878]	6285 (167)	-420 [-713-(-127)]	959	991 [504-1479]		

¹ Co= control group, In= Intervention, ² Adjustments were made for age, length of stay, sex, nursing home and the cluster effect of wards.

DISCUSSION

The meal ambiance project had a positive effect on quality of life, physical performance, and body weight of the residents. Over a period of six months, it counteracted a decrease in all these outcome measures.

Eighty nine percent of the invited residents agreed to participate in the study. A total of 28 % of the residents did not complete the study for various reasons (see trial profile). These residents had similar characteristics as the residents who completed the study. Moreover, considering the low non-response (11%) and the general inclusion criteria we conclude that the study population was representative for the Dutch nursing home residents with a chronic somatic disorder.

By excluding residents with dementia, an important group of nursing home residents is missing. Earlier research showed that residents with dementia benefit from these kind of interventions.⁵⁻⁷ Therefore, although the study population is not representative for all nursing home residents, we think that the principal conclusion of this study may be extended to all nursing home residents.

Although many people support the idea that a warm and social ambiance during mealtime can contribute to well being of nursing home residents, only a small number of studies measured its effects in a systematic way.^{4-7 19 20} In our pilot study we found similar results as in this study, but the statistical power was too low to make strong inferences.⁴ Most of the studies concerned residents with cognitive impairment, and with outcome variables that reflected changes in behaviour instead of quality of life. The sample sizes in these studies were very small ($n < 30$).⁴⁻⁷ Two other studies optimized ambiance during mealtime by changing the food delivery system and focused on outcome measures such as food intake and body weight.^{19 20} In both studies there were no statistically significant changes in body weight, which was probably due to the short intervention periods, i.e. 3 months and 10 weeks.

Considering the simple method of optimising the ambiance during mealtimes, the already rather low quality of life of the residents, and the limited prospect of revalidation or discharge the observed difference of 6 points (10%) quality of life is an important figure. Earlier research with the same questionnaire showed differences of 15 points (26%) of quality of life in nursing home residents between their admission to a stroke rehabilitation program and their discharge.¹⁸ Studies with a more drastic intervention, coronary artery bypass graft surgery, had higher differences in physical functioning (25% vs. 13% in our study), social functioning (16% vs. 13% in our study) if we recalculated the estimates to proportions.²¹ However in an activity stimulating program for older community dwelling persons and a lay health mentoring in older persons with ischemic heart diseases the differences for physical functioning (6.1 and 5.4) were similar and were substantially lower for psychosocial functioning related aspects (0.4 and 4.4 vs. 7.4) to our study.^{22 23}

The meals that were offered to the residents in the control and intervention groups were similar in respect to weight and nutrient content. Nutrition assistants in the intervention group were trained to order the same amounts of food they ordered before the intervention, and the kitchen staff made sure that both wards got identical menus. The only difference was the moment of choice. This implies that the effects of the current intervention cannot be attributed to differences in food availability.

The protocol we used has to be considered as one package. Based on this study we cannot say which part of the intervention protocol had the most impact on the residents. We chose for this protocol based on the Dutch situation, but there are other models to improve the ambiance during mealtime, such as restaurant, meals prepared by the residents and wait-staff service.^{19 20 24}

Like in most countries, Dutch nursing homes are limited in personnel and financial budget. Therefore we had to design an intervention protocol that did not need extra personnel or would either increase the workload of the nurse or the costs of the meal. The financial costs were limited to buying the required materials such as tablecloths and dishes. With a motivated staff, this program is easy to do with a low budget. The enthusiasm of the residents and nursing staff convinced the management teams and nursing home boards to proceed with the projects and to implement the program also in other wards.

The meal ambiance project provides a cost and labour efficient intervention that counteracts decreases in quality of life, physical performance, and body weight. It is recommended to implement this protocol on a large scale.

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CHAPTER 5: EFFECT OF FAMILY STYLE MEALS ON ENERGY INTAKE AND RISK OF MALNUTRITION IN DUTCH NURSING HOME RESIDENTS: A RANDOMIZED CONTROLLED TRIAL

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Background: Social facilitation and meal ambiance has beneficial effects on food intake in healthy adults. Extrapolation to the nursing home setting may lead to less malnutrition among the residents.

Objective: To investigate the effect of family style meals on energy intake and the risk of malnutrition in Dutch nursing home residents.

Design: In 2002/2003 a randomized controlled trial was conducted among 178 residents (mean age 77 years) in five Dutch nursing homes. Within each home, two wards were randomized into an intervention (n=94) and a control group (n=84). During six months the intervention group received their meals in family style, and the control group received the usual individual pre-plating services. Outcome measures were energy intake (kJ), carbohydrate (g), fat (g) and protein intake (g) and Mini Nutritional Assessment score (MNA score 0-30).

Results: The change in daily energy intake between control and intervention group differed significantly (991 kJ 95% CI 504 – 1479). The difference in intake of macronutrients was 29.2g (95% CI 13.5-44.9) for carbohydrate, 9.1g (95% CI 2.9-15.2) for fat and 8.6g (95% CI 3.4-13.6) for protein. The percentage of residents in the intervention group classified by the MNA as malnourished decreased from 17 % to 4% while this percentage increased from 11 % to 23% in the control group.

Conclusions: Family style meals stimulate daily energy intake and protect nursing home residents against malnourishment. Therefore, replacement of the pre-plating meal services with family style meals in nursing homes is recommended.

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INTRODUCTION

In Western countries prevalence of malnourishment among elderly living in nursing homes range from 17% up to 65%.¹ Malnutrition among elderly can be classified into cachexia (involuntary loss of fat free mass without weight loss), wasting (involuntary weight loss) and sarcopenia (loss of muscle mass and strength).² These conditions are determined by a variety of causes, among which physiological, psychological, medical, social, and environmental factors. Malnutrition has serious negative consequences, such as a higher prevalence of infections, hospitalisation, dysfunctions and an increased morbidity and mortality.²⁻⁵ Prevention of malnutrition has favourable effects on the independency and the quality of life of nursing home residents.^{6,7}

Since malnutrition in nursing home residents has many determinants, this issue has to be addressed with a multi-factorial intervention. One important factor, which can be modulated easily in a positive way, is the meal ambiance. The ambiance, defined as the atmosphere of the social and physical environment present with a meal may stimulate eating behaviour. Colours, sounds, smell, textures, portion size, presentation and the presence of others may contribute favourably to food consumption.⁸ Eating with others has shown to lead to an energy intake increase of up to 76% compared to eating alone.⁹ The concept of improved meal ambiance can be implemented in a nursing home setting through the way food is served, the presence and behaviour of nurses and the organisation around the meal.

The results of four previous intervention studies in frail elderly on meal ambiance and nutritional status are inconclusive, due to the small sample sizes, limited study duration or lack of control group.¹⁰⁻¹² In two studies the food delivery system was changed from a pre-plating service to a more home-like service. This intervention resulted in a significant increase of food intake in one study (1400kJ), but not in the other (1550 kJ); body weight did not change.^{10,12} A buffet-style program had no effect, neither on body weight, nor on the biochemical markers of nutritional status of the residents (n=40).¹¹ In our one-year intervention pilot study residents (n=22) gained weight (3.3kg), but no statistically significant increased food intake was reported.¹³ This negative finding may be attributed to a lack of statistical power (n=22). Therefore we conducted a 6 months intervention study in 5 nursing homes to investigate if family style meals increase energy intake sufficiently to improve or maintain energy balance and to decrease the risk of malnutrition of Dutch nursing home residents.

PARTICIPANTS AND METHODS

Recruitment

The nursing homes (NHs) were recruited by an advertisement in a nationwide journal for nursing homes. In total 53 NHs expressed their interest of which five of them met our eligibility criteria. The NHs had to be medium sized (175-275 beds) with a general nursing home population. There had to be two wards with residents with chronic somatic diseases and long term care or permanent stay. At the time of admission to the nursing home, the residents were assigned to one of these wards based on vacancy of beds and not based on the main diagnosis of diseases. The eligible wards had to be similar in staffing i.e. number, discipline, and education; in

infrastructure, location and residents' activities and the NH's had to be located in different parts of the country.

Wards were randomly allocated to either the control or intervention ward. The randomisation was based on the ward's name. The ward with the name of which the initial letter occurred as the first in the alphabet became the 'intervention ward'. We did not visit the wards nor had any contact with the staff and residents, before allocation. Furthermore the management of the nursing homes was not aware of the allocation procedure. Only after this procedure the researchers visited the wards and their personnel.

In total 282 nursing home residents were invited to participate in a study to examine the effects of a new foodservices system. All residents received an information brochure of the study, and were invited to attend an information meeting. Written informed consents were obtained by the nurses after the meeting. Residents were excluded when they had a life threatening disease, had total parenteral feeding, or were not able to give an informed consent due to their physical or mental condition. The medical ethical committee of Wageningen University, the client board and medic-ethical committees of the participating nursing homes approved the study protocol.

Family style meal organisation

The six months intervention program consisted of five modules: table dressing, food services, staff protocol, residents' protocol, and mealtime protocol. **Table 14** describes the protocols. Before the start of the meal, tables were set with tablecloths, silverware and china. The cooked meal was served in dishes and residents had the opportunity to choose from two kinds of vegetables, two kinds of meat and potatoes. Breakfast and lunch were also served in family dinner style.

The control wards maintained the individual pre-plating service in which the residents had to choose their menus two weeks beforehand. At lunchtime these residents received their plateau with their soup, main course, side dish and dessert on. On request the residents could dine alone or at their room. On the tables there were no tablecloths, flowers or other mealtime attributes presented. Staff was not sitting down with the individual residents but kept an eye on the group. They distributed the residents' medication, or were having private conversations during the residents' meal.

In both groups residents had breakfast from 7.00-10.00, cooked lunch at 12.30 and dinner at 17.00. After the implementation only the duration of the cooked lunch of the intervention group lasted longer; 10-15 min. Non-participating residents were given the same meal services as participating residents in their ward.

Implementation conditions

In each nursing home a strictly standardized implementation protocol was followed. The management teams of the nursing homes were contacted and after their consent, the eligible wards were approached for participation. At the intervention wards, project teams were formed and consisted of the head of the ward, the nutrition assistant of the ward, a dietician, the head of the kitchen, and the facility manager of the nursing home. The implementation plan and the intervention were explained to the staff. We emphasised that the cooking staff had to deliver the meals in dishes in the intervention ward instead of on trays. They had to offer the

same menu choice in both trial wards. Food availability was kept the same for the intervention and the control group by limiting the amount in the dishes to the sum of the individual portion of the number of residents sitting at the table. To accommodate the workload of the staff arisen from the changes in tasks, the cooked lunchtime meal was changed first and one month later the service of breakfast and dinner was changed.

The control wards were not allowed to implement any food-related changes during the study period. During the six-month period, the researcher (KN) made unannounced visits to the wards, three times a month, to determine whether the nurses made no changes to the meal programs in the intervention or the control ward. Each ward had their own staff, the staff members did not switch from intervention to the control ward.

Table 14. Detailed intervention description to optimize the meal ambiance in Dutch nursing homes.

INTERVENTION	
Tables dressing	<ul style="list-style-type: none"> ▪ Tablecloth ▪ Drinking glass (no plastic cups) ▪ Normal plates (plates not divided into 3 sections) ▪ Full cutlery ▪ Napkins ▪ Subtle flower arrangements
Food services	<ul style="list-style-type: none"> ▪ The cooked meal is served in dishes on the table. Menu choice between two types of vegetables, meat and potatoes. ▪ During breakfast and supper no ready-to-eat-sandwiches.
Staff protocol	<ul style="list-style-type: none"> ▪ Staff sits down at tables and chat with the residents. ▪ Min. 1 nurse / nutrition assistant / volunteer per table ▪ Staff asks what residents want for dinner. They don't automatically give 'the usual' ▪ There is no staff switch during mealtimes ▪ Medication is handed out before the start of the meal. ▪ Directly after the meal, the dining room will be tidied up.
Residents protocol	<ul style="list-style-type: none"> ▪ Balanced table dining groups of residents ▪ Mealtimes start when everybody sits down at tables ▪ Before mealtime there is a moment for reflection/prayer
Mealtime protocol	<ul style="list-style-type: none"> ▪ No other activities (cleaning, visits from doctor...) during mealtime. ▪ The dining room is closed during mealtime for visitors and health care givers. Exception: Observation by Health care giver during mealtime is necessary or visitors help the residents. In both cases, they have to be in the room at the start of the mealtime and remain until the end. ▪ Meal, drug and resident files carriages have to be out of sight of the residents

Baseline data

The baseline characteristics sex, age, length of stay, number of drugs and dietary supplements were collected from the nursing files of the residents. The use of dentures was asked directly to the resident.

Energy intake

Trained project dieticians measured food intake with the observation and weighing-back method during three 'working-days' before and after the intervention.¹⁴ In general these days were independently of each other. An observation day started at 6.00 AM and ended at 10.00 PM. All foods and drinks consumed by the residents during three days were recorded. One day prior to the dietary assessment, the content of household equipment (spoon, cup, etc), portions sizes and recipes of the meals were measured three times and the mean was used as standard portion. Energy intake during bread-based meals and snacks between meals were measured by observation using the computed standard portions of the involved nursing home. The portion sizes of each meal component of the cooked meals were weighed for three standard meals of each day. These measures combined with the individual ordered menu of the resident gave the amount of food that the residents received. After the meal the leftovers of all meal components of each resident were weighed back. Due to the change in the cooked meal services in the intervention group from individual plates to serving-dishes, the observation and weighing back method had to be adapted for the end measurement. Before serving, the content of the serving-dishes was weighed and a trained dietician carried out the task of the 'table nurse' while she observed how many household units the residents took. Afterwards, the leftovers of the individual plates and serving-dishes were weighed. During the night, nurses noted if a resident consumed some food and drinks. The obtained dietary data were converted into macronutrients by using a VBS food calculation system (BAS nutrition software), a computerized version the Dutch food composition table 2001¹⁵.

Mini Nutritional Assessment® (MNA®)

We used the MNA as an assessment tool to identify residents at risk of malnutrition.^{16 17} The assessment questionnaire consists of 18 questions, which can be classified in:

- ❖ Anthropometric assessment: weight loss over past 3 months, BMI, mid upper arm circumference and calf circumference
- ❖ General assessment: 6 questions related to lifestyle, medication and mobility
- ❖ Dietary assessment: 8 questions related to number of meals, food and fluid intake, and autonomy of feeding
- ❖ Subjective assessment: self perception of health and nutrition

The maximum score of the MNA is 30 points. A total score of 17 – 23.5 indicates risk of malnutrition while a score of < 17 indicates existing malnutrition. A total score of > 23.5 indicates a satisfactory nutritional status. The MNA

assessment was performed as indicated by the MNA clinical practice user guide and performed the day after energy intake measurements.

Body weight

We used mechanical sitting weighing scales (Seca, to the nearest 0.2 kg), a digital sitting scale (cormier type F.H. to the nearest 0.1 kg), and digital lifts with weighing device (UWE CCS – 150 K, Arjo Move, Arjo Maxi Move, and TR-Care, to the nearest 0.1 kg) to measure body weight. All weighing scales were calibrated an hour before measuring by putting 60 kg on the scales. Body weight was corrected when scales were deviant. The nurses measured the body weight of the residents in the presence of the researcher (KN). Body weight was measured between 2.00 pm and 4.00 pm and after voiding. The residents were wearing normal clothing without cardigan and shoes. Body weight and body composition were measured at the same day one week before energy intake measurements.

Body composition

Body composition was measured at 7.00 AM before breakfast and after voiding. The residents wore their nightclothes and were still lying in their hospital bed. Two adhesive electrodes with a surface area of 5 cm² were placed on the left hand and two on the left foot. Impedance resistance was measured at 50 KHz using a Xitron 4000 bioimpedance analyzer. Total body water (TBW) was calculated for women as $0.2715 * \text{Height}^2 / Z50 + 0.1087 * \text{body weight} + 11.9$ ¹⁸ and for men as $0.3228 * \text{Height}^2 / Z50 + 0.1652 * \text{body weight} + 8.3$ ¹⁸. Fat free mass (FFM) was calculated as $\text{TBW}/0.732$ ¹⁹. Fat mass was calculated as $\text{body weight} - \text{FFM}$.

Arm and calf circumferences

Mid upper arm and calf circumference were measured as indicated by the MNA[®] clinical practice user guide. The mid arm circumference was measured at the non-dominant arm. The resident had to bend the arm at the elbow at a right angle with the palm up. The distance between acromial surface of the scapula and the olecranon process of the elbow on the back of the arm was measured and the midpoint was marked. After that the resident let the arm hang loosely by their sides the circumference was recorded with a tape measure to the nearest 0.1 cm.

The calf circumference was measured while the resident was sitting with the leg hanging loosely. The tape measure was wrapped around the calf at the widest part. Additional measurements above and below the widest point were taking to ensure that the first measurement was the largest. Calf circumference was measured to the nearest 0.1 cm.

All anthropometric measures were performed in duplo and the mean was used. If the two measured differ more than 5mm or 0.5 kg, measures had to be redone.

Statistical analyses

The sample size was calculated on the basis of a 210 kJ/day extra intake, which would lead in a six month period to a 1.2 kg weight gain in healthy adults. A sample size of 60 in each group was needed to achieve significance difference in energy intake at a level of 5% with 90 % statistical power for a two-tailed type I error. Because of an expected mean dropout rate of 50% over a six-month period, the total number of residents in each group at the start of the study was estimated to be

120.²⁰ To our knowledge there were no intra class correlation coefficients (ICC) for food intake published. Based on our results the ICC is 0.031 and the correlated design effect is 1.5. The obtained ICC in this study were computed with the formula of Fleis; $ICC = \frac{\text{Between wards Mean Square} - \text{Within wards Mean Square}}{[\text{Between wards Mean Square} + (\text{pooled cluster size}-1) * \text{Within wards Mean Square}]}$.²¹ Therefore we would need 88 residents in each group.

The randomization took place on the level of nursing wards and not on resident level. Therefore we performed a linear mixed model with random intercept to adjust for clustering effects within wards.²¹

Adjustments were made for age, because residents in the intervention group were older (see **Table 15**).²² Although baseline sex and length of stay were not significantly different between the control and intervention group, we adjusted the models for these two factors because other studies showed an effect of sex and duration on changes in body weight. In further analyses the variable nursing home turned out to be a confounder, therefore all outcome measures were also adjusted for the unmeasured effect of nursing home.

Table 15. Baseline characteristics of the intervention group and control group

	INTERVENTION	CONTROL
N	94	84
MEAN (SD)		
Age (years)	78 (11.1)	75 (9.9)*
Length of stay (months) [#]	23 (12-48)	32 (8-52)
BMI (kg/m ²)	28.7 (6.8)	28.4 (5.8)
Drug (number)	7 (3.1)	7 (3.6)
Diseases (number)	3 (1.4)	3 (1.6)
PROPORTIONS		
Female	70	55
Dietary supplements	25	18
Dental status		
Own teeth	14	14
Partial dentures	2	10
Complete dentures	79	65
Edentulous	4	11
CVA	54	42
No psychological problems (MNA)	55	58
Bedsore (MNA)	30	33
Wheel chaired	78	86
MNA Malnourished	17	11

[#]Median (Q1-Q3) * p<0.05

The MNA classifications were analysed with the non-parametric test Mann-Whitney test. Statistical analyses were carried out using the SAS 9.1 system (SAS institute Inc., Cary, NC, USA).

RESULTS

Residents' baseline characteristics

Of the 282 residents who we invited to participate, 250 were willing to cooperate. We excluded 5 residents, because one was subcomateus, two were declared terminally ill and two switched over to parenteral nutrition in the period after they gave their consent. During the research period 34 residents died, 11 moved to another institution or nursing ward, 19 were discharged, and 3 residents withdrew their consent. In total 178 residents completed the study. (See **Fig 2**). Complete data of food intake was available of 94 residents of the intervention group and 84 residents of the control group. Baseline characteristics are presented in **Table 15**.

Energy intake

Mean energy intake of the residents of the intervention group was 5979 kJ at baseline and after the intervention period this intake increased with 483 kJ (95% CI [88-878]). The control group had a baseline mean energy intake of 6285 kJ and by the end of the intervention period their mean intake dropped with 420 kJ (95% CI [-713-(-127)]). The estimated mean of individual changes between control and intervention group differed significantly (992kJ 95% CI [504-1479]). (See **Table 16**)

Macronutrients

Carbohydrate (12.9g, 95% CI [0.28–27.1]), protein (4g, 95% CI [1.4-6.4]) and fat (4.5g 95% CI [0.8-8.4]) intake within the intervention group increased significantly. Within the control group, the decreases of carbohydrate (-14.9g, 95% CI [-23.4-(-6.4)]) and protein (-3.7g, 95% CI [-6.3-(1.1)]) intake were significantly, but not for fat intake (-3.1g, 95% CI [-7.9-1.6]). The estimated difference between control and intervention was 29g (95% CI [13.5-44.9]) for carbohydrate, 9.1g (95% CI [2.9-15.2]) for fat and 8.6g (95% CI [3.4-13.6]) for protein. (See **Table 16**)

MNA and anthropometric data (See Table 17)

Mean MNA[®] score increased statistically significant (95% CI [1.5-3.4]) within the intervention group with 2.5 points, while it decreased significantly (95% CI [-0.1-3.1]) within the control group with 1.5 points. The estimated difference between control and intervention was 3.9 (95% CI [2.3-5.6]).

For the variables mid upper arm and calf circumference similar trends were seen, but the estimated differences between groups (0.52cm and 0.53cm) were not statistically significant (95% CI [-0.2-1.3] and 95% CI [-0.06-1.1]). On the other hand the decrease (-1.1kg) of body weight in the control group was statistically significant, as well as the estimated difference (1.5kg 95% CI [0.4-2.7]) between the groups. In both groups, the FFM of the residents decreased. The estimated difference between both groups for FFM was 1.3kg (95% CI [0.12-2.4]). The variable FM had a similar trend as observed for body weight (0.5kg 95% CI [-1.4-2.2]).

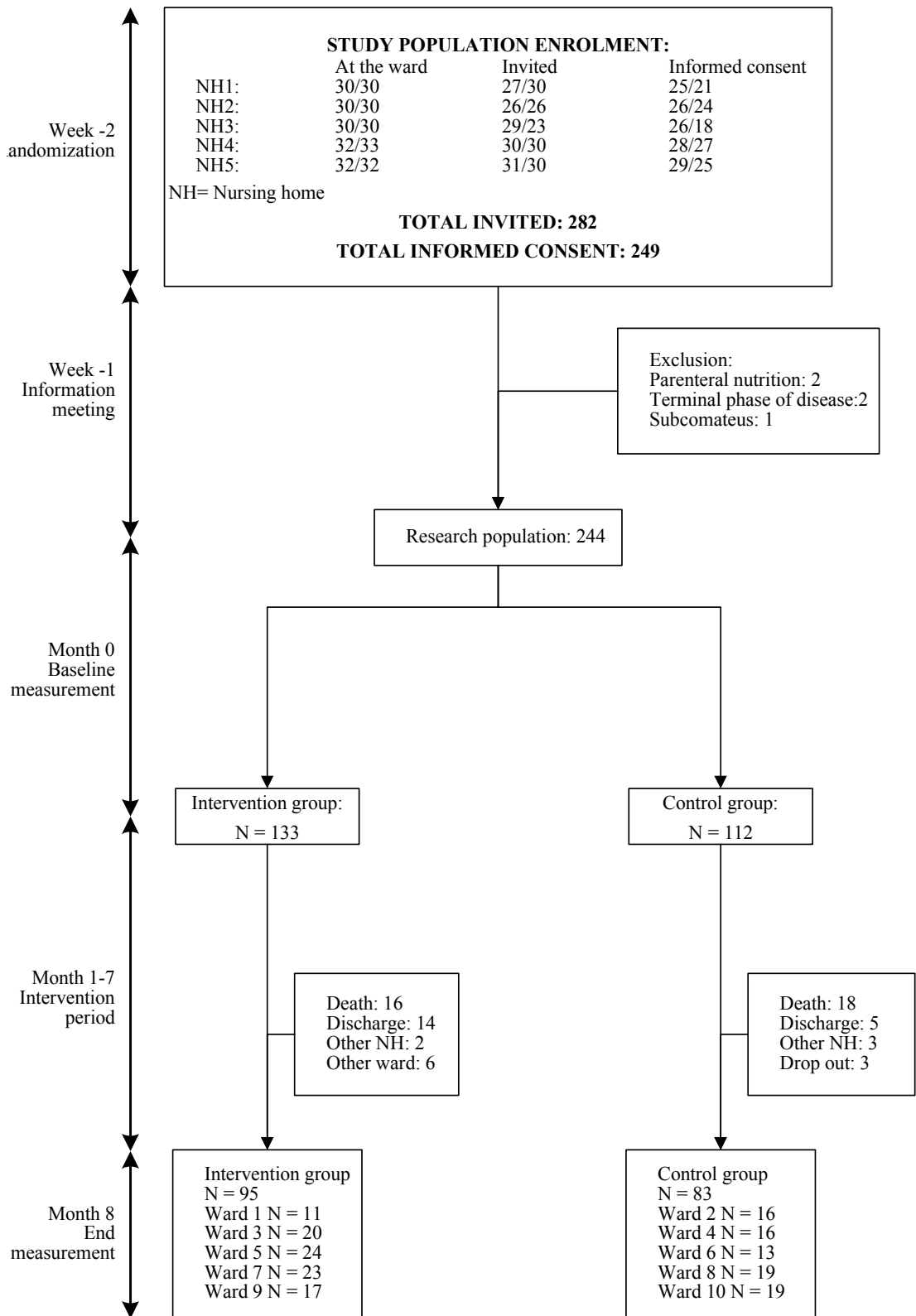


Fig 2. Chart flow residents recruitment

Table 16. Mean 24h energy intake (SE) of Dutch nursing home residents before and after the meal ambiance intervention, changes (se) and estimated difference with CI

	INTERVENTION (N=94)			CONTROL (N=84)		
	Baseline (se)	Change (se)	Baseline (se)	Change (se)	Estimate $\Delta \ln-\Delta Co^1$	CI
Energy kJ	5979 (139)	+483 (199)*	6285 (167)	-420 (148)*	991	350-1126
Kcal	1423 (33)	+115 (47)*	1496 (39)	-100 (39)*	235	83-268
Carbohydrate (g)	174 (4.2)	+13 (7.2)*	187 (6.2)	-14.9 (4.3)*	29	13.5-44.9
% total energy	50.2 (0.7)	+0.3 (0.6)	50.6 (0.6)	-0.5 (0.6)	-0.002	-3.6-3.6
Fat (g)	53 (1.7)	+4.5 (1.7)*	54.9 (1.6)	-3.1 (2.4)	9.1	2.9-15.2
% total energy	32.4 (0.6)	+0.2 (0.3)	32.3 (0.5)	+0.2 (0.8)	-0.5	-2.7-1.6
Protein (g)	58 (1.5)	+4.0 (1.2)*	59.3 (1.7)	-3.7 (1.3)*	8.6	3.4-13.6
% total energy	16.7 (0.2)	-0.17 (0.3)	16.2 (0.2)	+0.06 (0.3)	-0.08	-1.6(-1.4)

Table 17. MNA score and mean anthropometric data of the residents before and after the meal ambiance intervention in Dutch nursing homes, changes (se) and estimated difference with CI

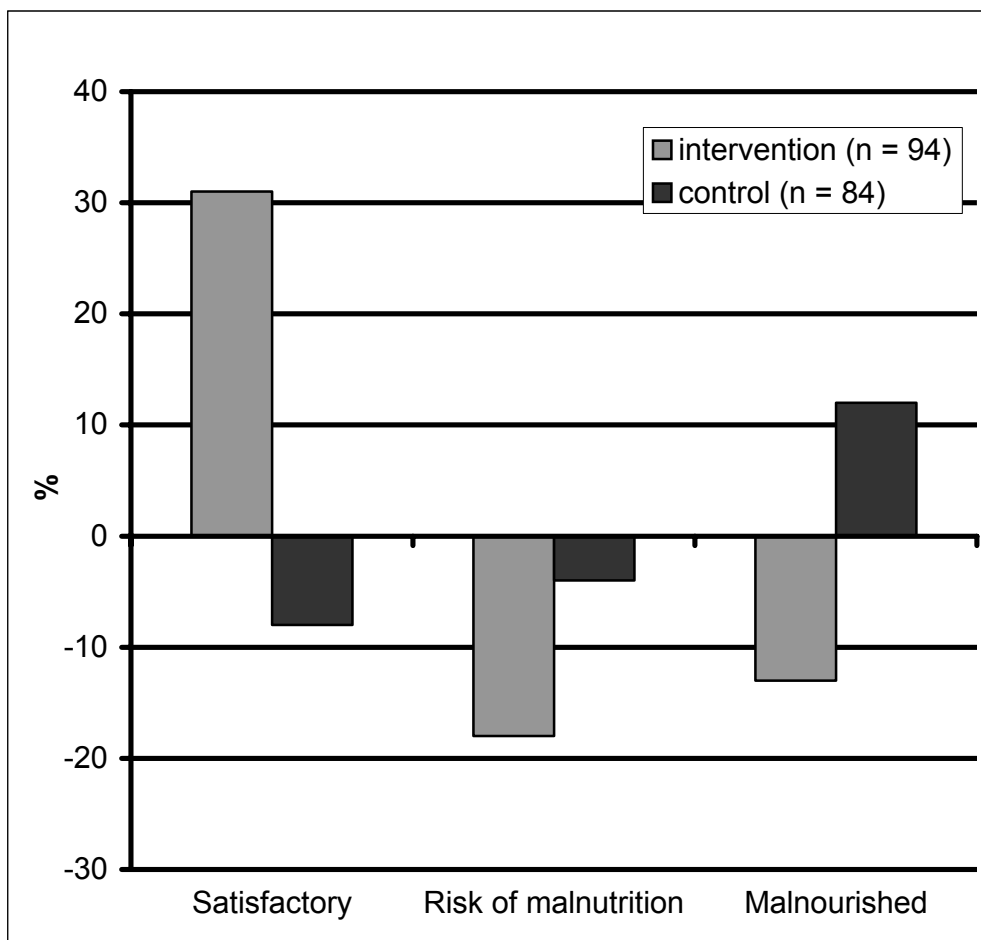
	INTERVENTION (N=94)			CONTROL (N=84)		
	Baseline (se)	Change (se)	Baseline (se)	Change (se)	Estimate $\Delta \ln-\Delta Co^1$	CI
Mean MNA-score (0 – 30)	20.1 (0.4)	+2.5 (0.5) *	21.1 (0.3)	-1.5 (0.8) *	3.9	2.3-5.6
Mid arm circumference (cm)	29.1(0.4)	+1.1 (0.3)*	30.2 (0.2)	+0.4 (0.3)	0.5	-0.2-1.3
Calf circumference (cm)	33.3 (0.5)	+0.2 (0.3)	32.7 (0.4)	-0.3 (0.2)	0.5	-0.06-1.1
Body weight (kg)	74 (1.7)	+0.5 (0.4)	75 (1.8)	-1.1 (0.4)*	1.5	0.4-2.7
Fat free mass (kg)	47.2 (0.9)	-0.5 (0.4)	48.1 (1.1)	-1.7 (0.5)	1.3	0.12-2.4
Fat mass (kg)	27.5	+0.8 (0.4)	26.7 (1.4)	-0.3 (0.6)	0.5	-1.4-2.2

¹ Co= control group, In= Intervention

MNA[®] classification (See Fig 3)

At baseline the MNA classification in both groups was similar ($p=0.15$). But at the end MNA classification was in groups statistically significant ($p<0.0001$) different. After the six months the group with a satisfactory nutritional status among the intervention group increased from 20 % to 51% while this percentage decreased from 25 % to 17% in the control group. The percentage of residents with risk of malnutrition in the intervention group decreased from 63 % to 45%, while this percentage in the control group remained stable. The percentage of the residents who were malnourished according to the MNA decreased from 17 % to 4% in the intervention group, while this percentage increased from 11 % to 23 % in the control group. The changes within groups were statistically significant different ($z = -4.5$ $p<0.001$).

Fig 3. The differences in percentages of classification the Mini Nutritional Assessment[®] of Dutch nursing home residents after the meal ambiance intervention



Note that the end classification between groups was significantly associated ($z=-5.1$ $p<0.0001$).

DISCUSSION

This intervention study in Dutch nursing home residents demonstrated that changing the meal services from individual pre-plating services to family style meals have a beneficial effect on the food intake (energy and macronutrients), body weight and body composition of the participants. The percentage of residents in the intervention group classified by the MNA as malnourished decreased from 17 % to 4% while this percentage increased from 11 % to 23% in the control group. Family style meals decrease the risk that nursing home residents will become malnourished.

In this study eighty nine percent of the invited residents agreed to participate. A total of 28 % of the residents who started the study did not complete it for various reasons (e.g. deceased and discharged). These residents had similar characteristics as the residents who completed the study, except for length of stay ($z=-5.36$, $p<0.0001$). The characteristics between the non-completers of the control and intervention group were also similar. Moreover, considering the low non-response (11%) and the general inclusion criteria we conclude that the study population was representative for the Dutch nursing home residents with a chronic somatic disorder.

The randomization procedure in this study was performed on the level of ward and we therefore had to take into account that the outcome measures within the same ward were not independent from each other. This was done by the use of a proc mixed model with a random intercept for wards. This random intercept corrects for the extent to which individuals in the same groups are similar to each other than individuals in different groups.^{21 22} In addition, other confounders, such as age, length of stay, sex and nursing home, were taken into account in the data-analyses. The factors nursing home and sex were statistically significant confounders for changes in energy intake. However, they did not have a significant effect on the estimated differences of energy intake or the other variables.

To observe potential effects of the intervention on energy intake and nutritional status, accurate measurement of food intake and anthropometry are of major importance. Therefore we used the observation and weighing-back method to assess daily energy intake instead of self reports.¹⁴ Calculating the mean daily intake of three days of each resident reduced the effect of the day-to-day variation of energy intake.¹⁴ Within each nursing home the same dieticians performed the energy intake observation for the control and intervention group. During two days the dieticians were trained in weighing and estimating amounts of food and how to code the obtained data. To lower the influence of the observation on the normal eating behaviour of the residents, measurements of the content of all used household units were performed one day prior to the energy intake observation. Towards the residents, the dieticians were presented as researchers to prevent that residents felt restricted in their eating behaviour.

Because meal services were changed to family style services, we had to adapt the energy intake observation method in the intervention group for the end measures of the cooked meal to guarantee that energy intake was measured at individual level. All serving-dishes were weighed before they were put on the table and the dieticians estimated the food intake of each resident based on the number of spoons taken. These estimations were verified by the weight of the content of serving-dishes before and after the meal and the leftovers on the individual plates. Therefore the dieticians could not be blinded for the intervention. During the rest of the day

the energy intake observation method stayed the same. In conclusion we hold the view that the chosen strategy for food intake recording was reliable and valid, and with this type of intervention within this population the most feasible with minor burden for the residents.

All anthropometric measures were performed in duplo. The fat free mass and fat mass were computed based on bio-electrical impedance method and an estimation equation which is especially designed for apparently healthy elderly by Visser et al. 1995. In that study the use of multi-frequency impedance in elderly was investigated and isotope dilution methods were used for reference. They concluded that the impedance at frequencies of 50 kHz and body weight could best predict total body water. Bio-electrical impedance is a technically simple method, which requires little subject cooperation and therefore it was practical to use in our field situation. A special protocol was designed to perform the measurements in an accurate way and to assure precise and valid outcomes measures.

The body mass is not a very reliable parameter in frail elderly. It does not take into account the changes in stature and body composition of the elderly.²³ Therefore, a more accurate indicator of the nutritional status was needed. The MNA is developed and validated especially to evaluate the risk of malnutrition and takes into account different predictors of malnutrition: anthropometric (weight, height and weight loss), global, dietary and subjective data.²⁴ Based on the MNA, 14% of our study population was malnourished and 65% was at risk. These numbers were more realistic than the results based on the BMI classification.

Family style meals were defined in a fixed protocol that in each intervention ward had to be implemented without major changes. The meals were differently presented to the control and intervention residents, but the meal components itself came from the same cooking units. Nutrition assistants in the intervention group were trained to order the same amounts of food they ordered before the intervention. In this way the residents were offered meals, which were similar in respect to weight and nutrient content. The only two differences were the presentation of the food and the moment of choice. This implies that the effects of the current intervention cannot be attributed to differences in food availability or food composition.

The potential confounding effect of factor of attention (Hawthorne) is minimized by an intervention period of 6 months. At the end (month 8) the ambiance project was seen as a normal procedure and most residents could not remember the old individually pre-plating services. After such a long period, the effect of attention should be similar in both groups.

An important factor to explain the observed effect is the process of social facilitation; the enhancement of behaviour due to the sheer presence of others. The sights and sounds of others doing the same thing augment ongoing responses.²⁵ Meals in family style could encourage the feeling of having the meal in company and therefore residents ate more compared with having their meals in individual pre-plating services. Social facilitation of meal size is not only related to the number of others present, but also to the extension of meal duration and the more social atmosphere.²⁶ Besides the number of residents also specific company, such as family, friends and their nurses, may enhance energy intake.²⁷ The social interaction during these meals increased by the extra attention residents received from the nurses who were sitting at the tables and who were instructed to stimulate

conversations. In this study we cannot say which part of the intervention protocol had the most impact on the residents. The protocol we used has to be considered as one package and other models, such as restaurant, meals prepared by the residents and wait-staff service could have the same effect.^{28 29}

Baseline energy intake (6.1 MJ/day) of the residents is in accordance with earlier observations (Mathey 5.4 MJ/day and 6.1 MJ/day, Elmståhl 5.8 MJ/day). The observed changes differed. During our study, mean energy intake in the intervention group increased significantly with 539 kJ and body weight changed accordingly. These changes were not observed in a study with residents with dementia.¹² Our increase in energy intake was smaller than the observed increases of Mathey (767 kJ) and Elmståhl (1400 kJ). However in these two studies there was no statistically significant difference between groups for body weight. This difference might be due to methodological problems of the three latter studies. For instance, they did not correct for the group effect. A study where residents were randomised on individual level did not show a significant difference in body weight ($p=0.638$), food intake was not measured.¹¹ But their intervention period lasted only 3 months. Not all studies focused on the nutritional effects of improved meal ambiance, they show the beneficial effects on the well-being of the residents.^{13 30-32}

Other studies tried to improve nutritional status with special designed diets, supplements or exercise programs.³³⁻³⁶ All of these were also successful. The advantage of our intervention is that we did not create a new task for the staff, but it was already embedded in the daily activity pattern. During the mealtimes the residents were given choices such as what to eat, they were stimulated to perform normal meal activities. They did not have to eat special designed supplements or diets.

In general, the management and nursing staff were enthusiastic about the project. In all 5 nursing homes the project was continued in both the intervention was implemented in the control and other wards. The project was also successfully implemented in closed psycho-geriatric wards after minor adaptations. These outcomes prove that the feasibility of the project is not only limited to a selected group of residents.

Since the organizational structure of meal services in Europe and the USA is quite similar to the Dutch setting, it is worthwhile to change the individual pre-plating services to family style meals. Considering that family style meals stimulates energy intake and prevents nursing home residents to become malnourished without a negative influence on staff satisfaction, workload, and cost we recommend replacement of the pre-plating meals services with family style meals in nursing homes.

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CHAPTER 6: MEAL AMBIANCE IN NURSING HOMES FAVOURABLY INFLUENCES FOOD CONSUMPTION OF RESIDENTS WITHOUT INCREASING WORKLOAD OF THE STAFF

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Background: Neglecting meal environment is considered one of the causes of malnutrition among nursing home residents.

Objectives: We hypothesize that nursing home residents increase their food intake during all three main meals after improving mealtime ambiance, without an increase of workload of the staff.

Method: In 2002 a cluster-randomized trial was conducted among 178 residents (mean age 77 years) in five Dutch nursing homes. Within each home, two wards were randomized in an intervention (n=95) and a control group (n=83). During six months the intervention group received their meals in family style, and the control group received the usual individual pre-plating services. Outcome measures were food intake assessed by observation and weighing-back method during three 'working-days' and work related satisfaction of the staff.

Results: The difference in change of energy intake between groups was statistically significant for the cooked meal 20 % (395kJ 95% CI [130-660]) and for the evening bread meal 18 % (291kJ 95% CI [63-519]), but not for breakfast 6 % (81kJ 95% CI [-76-240]), morning snack 22 % (78 kJ 95% CI [-121-279]) and noon snack 12 % (68kJ 95% CI [-246-109]). The majority of the staff (70%) indicated that their workload was not changed or even decreased and was satisfied with the working climate during the project.

Conclusion: Family style meal services have a favourable effect on food intake of nursing home residents without increasing workload of the staff. Therefore replacement of the individually pre-plated services is recommended.

Submitted

INTRODUCTION

A recent nationwide Dutch prevalence study estimated that 17 % of the Dutch nursing home residents are malnourished and 22% at risk.¹ These numbers are in line with international estimates (17 % up to 65 %).²

One of the causes is an unpleasant meal environment, which impact is often underestimated or neglected in practice.³⁻⁸ In most nursing homes meals are individually served on trays in a non-stimulating social environment and in this way meals are provided in a task oriented way rather than resident oriented way.⁹ Moreover 60% of the nursing home residents is not satisfied with their meal provision.¹⁰

Food choice, and therefore food intake, is influenced by a large number of interrelated factors, which can be divide in internal signals (satiety, hunger, thirst, appetite i.e.) and external signals (social environment, economics i.e.).¹¹ Research suggests that internal physiological factors are less responsive as aging progresses. De Castro (2002) showed for different age groups a positive correlation between self-rated hunger before a meal and actual energy intake during meal. However these correlations were significantly smaller for older individuals. Therefore the influence of hunger on intake may be smaller in elderly than in young individuals.¹² In a study of Zandstra et al. (2000) different age groups had to rate their subjective feelings of hunger and satiety after four preloads with different energy levels (control: 0.7MJ/500g, carbohydrate: 2 MJ/500g, fat: 2 MJ/500g, carbohydrate + fat: 3MJ/500g). The appetite ratings between the four different energy levels differed more in the young adults than in the elderly.¹³ This indicates that the elderly were less sensitive to the energy content of the preloads. Moreover Roberts et al (1994) showed that aging is also associated with an impaired ability to accurately regulate food intake. After a period of overfeeding or underfeeding older subjects could not regain their previous weight-maintenance requirement.¹⁴ Their ability to compensate after a period of fasting (e.g. due to illness) decreases.

Hence, the decline in the effectiveness of the physiological systems with age makes the elderly particularly vulnerable and unable to rebound from deficits.¹⁵ Therefore, the regulation of food intake of elderly people may become primarily influenced by external factors, instead of internal factors.

Such external factors that may favourably contribute to food consumption during the meals are for instance: the colours, the smell, the textures and the portion size of the meals but also factors which optimize social and physical ambiance such as music, serving meals in a common area and stimulating social interaction.¹⁶⁻²⁰ Many of these factors are derived from descriptive studies or intervention studies with small sample sizes (n = 6 – 29) or no control groups. As far as we know, there are no data available on the long term effect of these external factors on food intake within nursing home residents in general.

Recently we showed that family style meals have a positive influence on resident's energy intake and quality of life. It counteracted decreases in the residents' quality of life, physical performance, and body weight. Moreover family style meals stimulated daily energy intake and protected nursing home residents against malnourishment. Although there was a clear effect on overall energy intake, we did not identify the primary source of this increase. By quantifying the differences of food intake per main meal we would like to alert nurses that these

differences are actually small and therefore hard to observe, but the effect on resident's health could be enormous. (Nijs et al. 2006)

Earlier research showed that decentralized food service system initially caused hardship for the staff and extra efforts were needed before general acceptance of the system by the staff was reached.²¹ Insight in the effect of the implementation of family style meals on nursing staff job satisfaction and workload might give valuable information to counteract staff problems during a general implementation of family style meals.

Based on a successful pilot study in which dinner was served in a more family style way we developed the 'Ambiance project'. By extending the protocol of the pilot study we hypothesized that nursing home residents would increase their energy intake during all three main meals, in particularly the cooked meal, and therefore increase their overall intake of important food groups; vegetables, fruit, grains, dairy and meat without an increase of workload of the staff.

METHODS

Participants

The majority of the Dutch nursing home population is totally dependent for bathing and dressing, is functionally impaired in the activities transferring from bed or chair and toilet use, and has incontinence problems. Residents with dementia live separately of residents with mainly physical disorders, such as stroke.

We invited nursing homes to participate in the 'Ambiance project' by means of an advertisement in a magazine distributed to each Dutch nursing home (n=333). In total 53 nursing homes (NHs) expressed their interest. Sixteen NHs met the eligibility criteria, six of them were willing to cooperate and five did actually implement the project. The eligibility criteria were:

- ❖ The NHs had to be medium sized (175-275 beds) with a general nursing home population.
- ❖ The NHs had to have two wards with residents with chronic somatic diseases (stroke, general malaise, osteoporosis, and neuropathy ed.) and long term care or permanent stay.
- ❖ The NH's had to be located in different parts of the country.
- ❖ The eligible wards had to be similar in staff numbers, disciplines, and education levels, in newness infrastructure, in location and residents' activities.

In total 282 nursing home residents were invited to participate. All residents received an information brochure of the study, and were invited to attend an information meeting. Written informed consent was obtained from participants after this meeting by the nurses. Residents were excluded when they had a life threatening disease, had total parenteral feeding, or did not sign an informed consent. The medical ethical committee of Wageningen University, the client board and medical ethical committees of the participating nursing homes approved the study protocol.

Wards were randomly allocated to either the control or intervention ward. The randomisation was based on the ward's name. The ward with the name of which the

initial letter occurred as the first in the alphabet became the ‘intervention ward’. The researchers did not visit the wards nor had any of them contact with the staff and residents, before allocation. Furthermore the management of the nursing homes was not aware of the allocation procedure. Only after this procedure the researchers visited the wards and their personnel.

Family style meal organisation

The six months intervention program consisted of five modules: table dressing, food services, staff protocol, residents’ protocol, and mealtime protocol. **Table 18** describes the protocols. Before the start of the meal, tables were set with tablecloths, silverware and china. The cooked meal was served in dishes and residents had the opportunity to choose from two kinds of vegetables, two kinds of meat and staples. Breakfast and the bread meal were also served in family style.

Table 18. Detailed intervention description to optimize the meal ambiance in Dutch nursing homes.

INTERVENTION	
Tables dressing	<ul style="list-style-type: none"> ▪ Tablecloth ▪ Drinking glass (no plastic cups) ▪ Normal plates (plates not divided into 3 sections) ▪ Full cutlery ▪ Napkins ▪ Subtle flower arrangements
Food services	<ul style="list-style-type: none"> ▪ The cooked meal is served in dishes on the table. Menu choice between two types of vegetables, meat and potatoes. ▪ During breakfast and supper no ready-to-eat-sandwiches.
Staff protocol	<ul style="list-style-type: none"> ▪ Staff sits down at tables and chat with the residents. ▪ Min. 1 nurse / nutrition assistant / volunteer per table ▪ Staff asks what residents want for dinner. They don’t automatically give ‘the usual’ ▪ There is no staff switch during mealtimes ▪ Medication is handed out before the start of the meal. ▪ Directly after the meal, the dining room will be tidied up.
Residents protocol	<ul style="list-style-type: none"> ▪ Balanced table dining groups of residents ▪ Mealtimes start when everybody sits down at tables ▪ Before mealtime there is a moment for reflection/prayer
Mealtime protocol	<ul style="list-style-type: none"> ▪ No other activities (cleaning, visits from doctor...) during mealtime. ▪ The dining room is closed during mealtime for visitors and health care givers. Exception: Observation by Health care giver during mealtime is necessary or visitors help the residents. In both cases, they have to be in the room at the start of the mealtime and remain until the end. ▪ Meal, drug and resident files carriages have to be out of sight of the residents

The control wards maintained the individual pre-plating service in which the residents had to choose their menus two weeks beforehand. At lunchtime these residents received their plateau with their soup, main course, side dish and dessert on. On the tables there were no tablecloths, flowers or other mealtime attributes

presented. During the meals staff distributed the residents' medication or was having private conversations. The menu choice was the same for the control and intervention group. Non-participating residents of the intervention group were given the same meal services as those in the study.

Demographic and life style data

Although the intervention program was implemented on ward level, measures were assessed at individual level.

Information on sex, age, length of stay, number of drugs, number of diseases and dietary supplements were collected from the nursing files of the residents. Nutritional status was assessed by the Mini Nutritional Assessment[©].²² It classifies nutritional status into three categories: malnourished, risk of malnutrition and well-nourished. The height of residents was measured by the knee-to-floor height (KFH). Body height was derived using the following formula: height (in cm)=3.16*KFH (in cm).²³ The use of dentures was asked directly to the resident

Intake of energy and food groups

Trained project dieticians measured food intake with the observation and weighing-back method during three 'working-days' before and at the end of the intervention period.²⁴ The dieticians observed from 6.00 AM until 10.00 PM food intake. During the night, nurses noted if a resident consumed some food and drinks. All foods and drinks consumed by the residents during three days were recorded. One day prior to the dietary assessment, the content of household equipment (spoon, cup, etc), portion sizes and recipes of the meals were measured three times and the mean was used as standard portion. Energy intake during bread-based meals and snacks between meals were measured by observation using the computed standard portions of the involved nursing home. The portion sizes of each meal component of the cooked meals were weighed for three standard meals of each day. These measures combined with the individually ordered menu of the resident gave the amount of food that the residents received. After the meal the leftovers of all meal components of each resident were weighed back.

Due to the change in the cooked meal services in the intervention group from individual plates to serving-dishes, the observation and weighing back method had to be adapted for the end measurement. Before serving, the content of the serving-dishes was weighed and a trained dietician carried out the task of the 'table nurse' while she observed how many portions the residents took. Afterwards, the leftovers of the individual plates and serving-dishes were weighed. The obtained dietary data were converted into macronutrients and food groups by using a VBS food calculation system (BAS nutrition software), a computerized version of the Dutch food composition table 2001.²⁵

Satisfaction and workload of personnel

A convenience sample of 55 employees completed a self-developed, 11-item questionnaire in a face-to face interview. The employees could score on a 5-point Likert-scale (1-5) their satisfaction with different items that allowed for open-ended comments. The scales ranged for the satisfaction items from: extremely unsatisfied (1), unsatisfied, not unsatisfied / not satisfied, satisfied and extremely satisfied (5).

The workload scales ranged from: extremely increased (1), increased, no change, decreased and extremely decreased (5). Outcomes are presented in proportions.

Statistical analyses

The sample size was calculated on the basis of a 210 kJ/day extra intake. A sample size of 60 in each group was needed to achieve significance difference in energy intake at a level of 5% with 90 % statistical power for a two-tailed type I error. Because of an expected mean dropout rate of 50% over a six-month period, the total number of residents in each group at the start of the study was estimated to be 120.²⁶ To our knowledge there were no intra class correlation coefficients (ICC) for food intake published.

The randomization took place on the level of nursing wards and not on resident level. Therefore we performed a linear mixed model with random intercept to adjust for clustering effects within wards.²⁷

Adjustments were made for age, because residents in the intervention group were older (see **Table 19**).²⁸ Although baseline sex and length of stay were not significantly different between the control and intervention group, we adjusted the models for these two factors because other studies showed an effect of sex and duration on changes in body weight. In further analyses the variable nursing home turned out to be a confounder, therefore all outcome measures were also adjusted for the unmeasured effect of nursing home.

Statistical analyses were carried out using the SAS 9.1 system (SAS institute Inc., Cary, NC, USA).

Table 19. Baseline characteristics of the intervention group and control group

MEAN (SD)	INTERVENTION (N=94)	CONTROL (N=84)
Age (years)	78 (11.1)	75 (9.9)*
Length of stay (months) #	23 (12-48)	32 (8-52)
BMI (kg/m ²)	28.7 (6.8)	28.4 (5.8)
Drug (number)	7 (3.1)	7 (3.6)
Diseases (number)	3 (1.4)	3 (1.6)
PROPORTIONS	INTERVENTION (N=94)	CONTROL (N=84)
Female	70	55
Dietary supplements	25	18
Dental status		
Own teeth	14	14
Partial dentures	2	10
Complete dentures	79	65
Edentulous	4	11
CVA	54	42
No psychological problems (MNA)	55	58
Bedsore (MNA)	30	33
Wheel chaired	78	86
MNA Malnourished	17	11

#Median (Q1-Q3) * p<0.05

RESULTS

Residents' baseline characteristics

Of the 282 residents who we invited to participate 250 took part in the study. We excluded 5 residents, because one was subcomateus, two were declared terminally ill and two switched over to parenteral nutrition in the period after they gave their consent. During the research period 34 residents died, 11 moved to another institution or nursing ward, 19 were discharged, and 3 residents withdrew their consent. 178 residents completed the study. The intervention group consisted of 95 residents and the control group of 83 residents (See **Fig 2**) The residents, who did not complete the study, were similar in demographic and baseline outcomes from those who completed the study. Residents' baseline characteristics are presented in **Table 19**.

Energy intake

Total energy intake of the intervention group increased with 481 kJ (95% CI [84-878]) while it decreased with 420 kJ (95% CI [-713-(-127)]) in the control group after six months (**Table 20**). These differences were statistically significant (991kJ 95% CI [504-1479]). Similar trends were observed for the three main meals. The observed differences were not statistically significant for the energy intake during breakfast. During the cooked meal the energy intake of the control residents decreased significantly with 266 kJ (95% CI [-502-(-30)]), while energy intake of the intervention residents' remained stable (+75 kJ 95% CI [-53-202]). These differences were statistically significant (395kJ 95% CI [130-660]). Further, during the bread meal residents' energy intake of the intervention group increased significantly (+193 kJ 95% CI [148-237]), while energy intake of the control residents' remained stable (-28 kJ 95% CI [-209-153]).

Food group intake

Intakes of the different food groups are presented in **Table 21**. An overall positive trend of increased amount of almost all food groups was observed for the intervention group while the amount (g) of intake of the control group decreased. These trends were not statistically significant. Neither when two groups were formed; a greenery group (vegetables, potatoes, fruit and legume) and meat group (meat, fish, sandwich filling and egg).

Satisfaction and workload of personnel

Of the 55 staff members, 67 % was between 41-55 years old, 45% worked fulltime and 78% was female.

84% of the staff indicated that they contributed in a positive way to the residents' meal. In total 31 % of the staff indicated that the workload was increased and only 11% was unsatisfied with the workload. On the other hand, 70% of the staff indicated that their workload was not changed or even decreased. Nobody was unsatisfied with their activities during the meals. More than 70 % of the staff was satisfied with the working climate; only 7 % was unsatisfied (**Table 22**).

Table 20. Differences in energy intake (kJ) during meals (time) of the intervention and control Dutch residents of nursing homes

	INTERVENTION (N=95)		CONTROL (N=83)		ESTIMATE β Δ In- Δ Co ¹ [CI 95%]	RELATIVE CHANGE*
	Baseline (sd)	β [CI 95%] ²	Baseline (sd)	β [CI 95%] ²		
Day intake	5979 (1311)	+481 [84-878]	6285 (1513)	-420 [-713-(-127)]	991 [504-1479]	16%
Breakfast (8.00 – 10.00)	1373 (540)	+72 [-51-196]	1268 (460)	-15 [-158-131]	81 [-76-240]	6%
Snack (11.00)	322 (240)	+2 [-32-35]	387 (575)	-66 [-229-96]	78 [-121-279]	22%
Cooked meal (12.30)	1891 (581)	+75 [-53-202]	2027 (661)	-266 [-502-(-30)]	395 [130-660]	20%
Snack (15.30)	596 (427)	+23 [-105-121]	503 (371)	-43 [-179-92]	68[-246-109]	12%
Bread meal (17.30)	1548 (560)	+193 [148-237]	1594 (540)	-28 [-209-153]	291 [63-519]	18%
Snack (19.30)	360 (283)	+134 [37-230]	381 (294)	+84 [10-157]	12 [-150-125]	3%

¹Co= control group, In= Intervention

Adjustments were made for age, length of stay, sex, nursing home and the cluster effect of wards.

²Relative change= Estimate β Δ In- Δ Co / [(baseline In*95)+(baseline Co*83) / 178] *100

Note: Changes are not cumulative because of the adjustments and not normally distribution of the changes of the snacks

Table 21. Mean estimates [CI] of amount (g) of food group eaten over the day by the Dutch nursing home residents

	INTERVENTION [CI 95%]	CONTROL [CI 95%]	ESTIMATE B $\Delta IN-\Delta CO^1$ [CI 95%]	P-VALUES
GREENERY	+14 [-33-62]	-32 [-57-8]	38 [-9-87]	0.12
Potatoes	+7 [-0.3-14]	-9 [-38-18]	14 [-17-45]	0.38
Vegetables	-1 [-22-20]	-4 [-21-13]	0.2 [-30-30]	0.97
Fruit	+8 [-21-37]	-19 [-50-12]	24 [-35-85]	0.42
Legumes	+0.2 [-0.1-0.5]	-0.1 [-0.2-0.4]	0.2 [-0.5-0.1]	0.24
MEAT & DAIRY	+19 [-7-45]	-6 [-20-7]	21 [-7-50]	0.14
Meat	+9 [-0.3-19]	-4 [-16-7]	15 [-4-35]	0.16
Fish	-4 [-19-11]	-0.6 [-7-6]	7 [-21-7]	0.18
Cheese	+4 [0.4-7]	+1 [-2-5]	2 [-4-8]	0.55
Sandwich filling	+1 [-0.5-3]	-2 [-4-0.7]	3 [0.6-6]	0.01
Egg	+9 [-5-23]	-0.3 [-4-4]	4 [-4.2-13]	0.31
OTHER				
Milk	-4 [-73-65]	-5 [-39-28]	4 [-35-43]	0.83
Bread	+5 [-4-15]	-5 [-14-4]	8 [-13-30]	0.45

Table 22. Staff (n=55) (%) perception of workload and satisfaction in relation to the ambiance project

WORKLOAD	++	+	+/-	-	--
Intensity of activities	0	16%	49%	31%	4%
Administrative work	0	7%	69%	20%	4%
Workload	2%	29%	46%	24%	0
Work rate	2%	24%	55%	20%	0
Commitment	0	15%	22%	53%	11%

++ = extremely increased, + = increased, +/- = no change, - = decreased, -- = extremely decreased

SATISFACTION	--	-	-/+	+	++
New activities	0	0	15%	76%	9%
Workload	0	11%	35%	51%	4%
Work rate	0	11%	35%	53%	2%
Work climate	0	7%	18%	58%	16%
Positive contribution to meal services	2%	0	15%	62%	22%
Commitment to the project	0	0	26%	73%	2%

-- = extremely unsatisfied, - = unsatisfied, -/+ = no change, + = satisfied, ++ = extremely satisfied

DISCUSSION

This intervention study in Dutch nursing home residents demonstrated that changing the meal services from individual pre-plating services to family style meals has a beneficial effect on the food intake during the cooked meal and the bread meal, but not during breakfast. The positive effect the extra intake of energy was not contributed by one particular food, but a trend was observed of generally small increases of intake across all food groups. Moreover, ward staff was satisfied with the implementation of the ambiance project and the new family style meal services did not increase their workload.

We considered the design of this study appropriate for answering the research questions. (Nijs et al. 2006) Accurate assessment of food intake was performed by the validated observation and weighing-back method instead of less precise recall reports. The observation and weighing-back method has only a 5% of energy intake underestimation, if the energy intake and expenditure of the subjects are in balance.²⁹ By implementing the ambiance project on wards with primarily residents with a chronic somatic disorder, an important group of nursing home residents is missing. Earlier research showed that residents with dementia also benefit from these kind of interventions.³⁰⁻³² Therefore, although the study population is not representative for all nursing home residents, we think that the principal conclusion of this study may be extended to all nursing home residents.

The study and power were designed to observe differences in energy intake during the day and the meals and not for observing changes in intake of specific foods.²⁴ The 24h energy intake variance, we used for sample size calculation, is smaller than the variance within and between for specific foods above that western diets consist of high variety of different food groups. Therefore a study with a more extensive sample size would be needed to observe significant differences in intake of specific foods. This explains why the observed positive trend within the intervention group and the negative trend within the control group were not statically significant. (**Table 21**) Therefore the observed changes within the different food groups have to be carefully interpreted. Nevertheless the changes for specific foods are very small but all together they have an important influence on residents' nutritional status.

In all main meals we saw similar trends, but only within the bread meal we saw the expected increase of energy intake. It was hard for the nurses to fully incorporate the ambiance project within breakfast, because the daily individual care of residents was on that moment more important. As a consequence care activities were not always paused to use breakfast all together, some residents had their breakfast at their room or alone in the dinner room afterwards. This could affect the energy intake during breakfast. During the cooked meal energy intake stayed stable within the intervention group while within the control group energy decreased. In all the participating nursing homes the cooked meal was served at midday, and because of the morning activity there was too less time between these two main meals and coffee break to expect a high energy intake during that meal. Another negative influence might be that residents were tired of the morning care activities. Nevertheless the ambiance intervention showed a counteractive effect as the intervention group did not decrease their energy intake during the midday meal as opposed to the control group. The energy intake increasing effect of the ambiance

project was most pronounced during the bread meal in the evening. Prior to this meal there are no intensive care activities or important meals. We expect that if care and meal organization would be more in balance over the day the ambiance project would have had an even stronger effect on energy intake.

Considering the relative small differences eaten by intervention and control residents of specific foods or during the specific meals it will be hard for nurses and nutrition assistants to notice in practice when residents are eaten less than normal. The consequence of these structural small decreases of food intake can have serious effects on the nutritional status of nursing home residents. (Nijs et al 2006) Therefore nurses should immediately undertake action if residents deviate of their normal eating behavior. A quick, simple and validated appetite questionnaire (SNAQ) can help the nurses to predict if residents are at risk for weight loss, and therefore indirect for malnutrition.³³

In general, the management and nursing staff were enthusiastic about the project. In all 5 nursing homes the project was continued and the intervention was implemented in the control and other wards as well. The project was also successfully implemented in closed psycho-geriatric wards after minor adaptations. This shows that the implementation of the project is not only possible in a selected group of residents.

There are many different ways of improving foodservices: restaurant, meals prepared by the residents and wait-staff service.^{9 34 35} The challenge is to acknowledge residents' wishes through patient oriented, rather than organisationally oriented meal procedures, and link physical status to food and food services.⁹ In summary, based on the positive effects of the ambiance project for both the residents and nursing staff we recommend replacement of the pre-plating meals services with family style meals in nursing homes.

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CHAPTER 7: DISCUSSION

The studies in this thesis focused on malnutrition among Dutch nursing home residents, and the beneficial effects of family style meal on resident's nutritional status and quality of life. This chapter summarizes the results from these studies. The findings are discussed in this chapter, which leads to a general conclusion, public health implications of our findings, and recommendations for further research.

MAIN FINDINGS

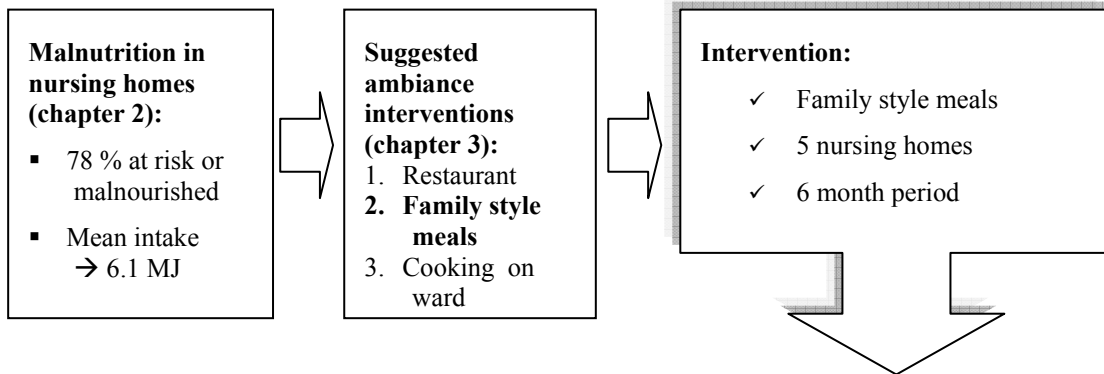
The main findings of the studies described in this thesis are summarized in **Fig 4**. In the observational study described in **Chapter 2** we estimated the food intake of Dutch nursing home residents with a chronic somatic disorder. The results of this study show that average intake of energy (6.1 MJ) and vitamins B1, B6, folic acid and vitamin D are insufficient. Food group intake data showed that they had sufficient intakes of dairy products and meat (proteins), potatoes, and cereals but an insufficient intake of vegetables, fruit, bread and beverages.

The inventory of strategies used in nursing homes to improve the ambiance during mealtimes, described in **Chapter 3**, showed that there are in general three different meal ambiance strategies: restaurant, cooking on the nursing ward and family style meals. Cooperation and motivation of staff, sufficiently sized space and management support were pointed out to be the most important incentives of meal ambiance strategies. The most important barriers were absence of cooperation and motivation of the staff, insufficient finances and insufficient personnel.

The randomized controlled trial, described in **Chapter 4 and 5**, showed that the meal ambiance project had a positive effect on quality of life, physical performance, body weight, and energy intake of the residents. Over a period of six months, it counteracted a decrease in all these outcome measures. Moreover, the energy (+483kJ) and macronutrient intake of the residents significantly increased. The percentage of residents in the intervention group classified by the MNA as malnourished decreased from 17 % to 4% while this percentage increased from 11 % to 23% in the control group. In **Chapter 6** we showed that the family style meal intervention had a beneficial effect on the food intake during the cooked meal (395 kJ [130-660]) and the bread meal (291 kJ [63-519]), but not during breakfast (81 kJ [-76-240]). Furthermore this study showed that the extra intake of energy was not caused by one particular food, but the increased energy was induced by small increases in the intakes of all food groups. Moreover, ward staff was satisfied with the implementation of the ambiance project and the new family style meal services did not increase their workload in general.

It is concluded that Dutch nursing home residents have an insufficient food intake and they are at high risk for malnutrition. Optimizing the ambiance during mealtimes has a beneficial effect on malnutrition and quality of life of Dutch nursing home residents without an increase of workload of nursing home staff.

Fig 4. Summary of the main finding of this thesis



<u>Effects</u>		
Quality of life (chapter 4)	Nutritional status (chapter 5)	Staff (chapter 6)
<ul style="list-style-type: none"> ▪ Overall QoL + → (10%) ▪ Physical performance + → (13%) 	<ul style="list-style-type: none"> ▪ Energy intake ++ → (16%) ▪ MNA ++ → (19%) ▪ Body weight + → (2%) 	<ul style="list-style-type: none"> ▪ Workload → 55 % satisfied ▪ Work climate → 74% satisfied ▪ Work commitment → 75 % satisfied
<p> += counteract of decline ++ = increase % = Relative Change = Estimate $\Delta In - \Delta Co / [(baseline In / N In) + (baseline Co / N Co)] / N total$ </p>		

INTERNAL VALIDITY

Study population – nursing homes

For generalizability reason we chose to perform the study in five different nursing homes. To guarantee comparability of all nursing homes we undertook two precautions. Firstly we held strict inclusion criteria to the nursing homes concerning size, similarity in staffing (i.e. number, discipline, and education) infrastructure, location and residents’ activities, resident assignment, and the different topographic location throughout the country. These precautionary measures had to diminish the effect of the different nursing homes. Secondly, in statistical analysis, we found out that nursing home had an impact on the variance of the observed effects; therefore we included this co-variable into the model. The effect of nursing home might be related to i.e. mealtime scheduling and staff attitude towards meal services. Moreover the attitude of the staff towards the meals could have influenced their compliance to the intervention. Many nursing homes have recently stated the importance of client oriented care in their mission. This mission is not yet completely implemented in daily practice. Both effects, baseline situation and compliance, are counteracted by having an intervention and a control group in the same nursing home. In conclusion a larger number of nursing homes would have

probably lead to more precise estimates of the effects, but the conclusions of the study would not be affected.

Study population – nursing home residents

In this study eighty nine percent of the invited residents agreed to participate. A total of 28 % of the residents who started the study did not complete it for various reasons (e.g. deceased and discharged). These residents had similar characteristics as the residents who completed the study, except for length of stay ($z=-5.36$, $p<0.0001$). The characteristics between the non-completers of the control and intervention group were also similar. Moreover, considering the low non-response (11%) and the general inclusion criteria we conclude that the study population was representative for the Dutch nursing home residents with a chronic somatic disorder.

Ethical considerations, fully informed consent of subjects, made it obligatory that residents knew before signing the informed consent, in which group they were allocated. Therefore every one of them received an information brochure of the purpose, the protocol of the study and in which group they were allocated. This could have an impact on their decision to participate and explain why there are fewer residents in the control group (112 vs. 132). It was not allowed to collect data of residents, which were not willing to participate in the trial. We expressed that non-participating residents were given the same meal services as participating residents in their ward.

Randomization

Ideally, a study with randomization on individual level would be preferred. This would guarantee within the limits of chance that control and treatment group will be comparable at the start of the study. As a consequence nursing home residents of the same ward could be allocated to a different group and could not dine together, which is common in Dutch nursing homes. We performed the randomization on ward level to prevent disruption of the organizational structure of the nursing homes, which would affect residents' daily life and therefore the outcome of the study.

Due to the used randomization level we had to take into account that the individual outcome measures within the same ward are not independent from each other. We included this design effect in the sample size calculation; this was done with the help of Intra-Correlation Coefficients (ICC) derived from Cosby.^{1 2} They estimated ICC's for different health measures. The ICC are based on sample size consisting out of 48 family physician practices (=clusters) with 15 seniors (65+) who took ≥ 5 medications. The SF-36 Physical Component Scale and SF-36 Mental Component Scale were used to measure these seniors' quality of life and the related ICC for these measures were 0.0207 and 0.0245.

Post hoc calculations of the actual intra class correlation coefficients of quality of life (0.0009), physical performance (0.006) and body weight (0.007) in this study showed that the main factor 'ward' contributed to the variance in scores of quality of life (1%), physical performance (10%) and bodyweight (12%). Although this is less than expected and the impact of ward on the variance of the observed effect would be limited, we assured the independence of observed effects by the use of a proc mixed model with a random intercept for wards.¹

The randomization procedure was based on name of the ward. The ward with the name of which the initial letter occurred as the first in the alphabet became the ‘intervention ward’; this is equivalent to random allocation. In the Netherlands it is common that wards have a name, for example ‘Wilgenbos’ and ‘Sparrenbos’. In this situation ‘Sparrenbos’ would become the intervention ward and ‘Wilgenbos’ the control ward. To blind the allocation of the trial wards, we did not visit the wards nor had any contact with the staff and residents, before allocation. Furthermore the management of the nursing homes was not aware of the allocation procedure. Only after this procedure the researchers visited the wards and their personnel. This allocation procedure might not be entirely a matter of chance and readers could question the comparability of the wards and the related results.³ It might be suggested that the name of the ward is somehow related to the residents’ admission to the ward. This was tackled by the inclusion criteria that the assignment of the residents was based on vacancy of beds and not based on the main diagnosis. Moreover the name of the ward in Dutch nursing homes is not related with the quality of care. Although there are some theoretical shortcomings of the used randomization procedure we maintain the opinion that in practice our procedure did not affect the allocation of the wards or the outcome parameters. We also think, considering the total number of the wards (10) a classic randomization procedure would not have given a different result.

Blinding the randomization to the residents was for obvious reasons impossible, unfortunately the fieldworkers could also not entirely be blinded for the intervention. Since meal services take a large part of the life in nursing homes, most residents brought up this issue during the quality of life interviews. The interview was conducted in a separated room of the wards where residents could freely speak up their mind without interference of nursing staff. The residents were also assured that nothing of the conversations would be briefed to the staff. To perform a precise estimation and record of food intake of residents the dieticians had to be present during the meals.

Confounding

At the start of the study we elaborated on potential confounders (sex, length of stay and age) to be included in the baseline and end measurements. We minimize the effect of (un)measured confounders by the random allocation. Therefore we assume that all expected (sex, length of stay and age) and non-expected potential confounders are equally distributed by the randomization process. Because there were some differences in gender, length of stay and age between both groups we added these in the statistical model. However, they did not have a significant effect on the estimated differences of outcome measures.

Food intake assessment

To observe potential effects of the intervention on energy intake and nutritional status, accurate measurement of food intake and anthropometry are of major importance. Therefore we used the observation and weighing-back method to assess daily energy intake instead of self reports or food frequency questionnaires.^{4 5} Calculating the mean daily intake of three days of each resident reduced the effect of the day-to-day variation of energy intake.⁵ Within each nursing home the same dieticians performed the energy intake observation for the control and intervention group. During two days the dieticians were trained in weighing and estimating

amounts of food and how to code the obtained data. To lower the influence of the observation on the normal eating behaviour of the residents, measurements of the content of all used household units were performed one day prior to the energy intake observation. Towards the residents, the dieticians were presented as researchers to prevent that residents felt restricted in their eating behaviour.

We aimed to measure food intake on three independent days, as recommended by Beaton (1979) and Willett (1998), this within a time period of 7 days without weekend days.^{4 6} The 7 day period did not have to start on a Monday. Weekend days were excluded, because many residents had visits of family and friends, who brought extra snacks, and distraction. Weekend days were therefore somehow deviant of 'normal' days and could influence the outcome measures. In each nursing home the residents could chose between 3 menus of which the menu components are mutually exchangeable. There were no institutions with a fixed menu cycles (ed. Friday = 'fish day'). Therefore variety of food intake is included in our procedure. In practice, due to festivals we did not always succeed to assess food intake on randomly assigned independent days.

Due to the intervention, we had to adapt the energy intake observation method in the intervention group for the end measures of the cooked meal to guarantee that energy intake was measured at individual level. All serving-dishes were weighed before they were put on the table and the dieticians estimated the food intake of each resident based on the number of spoons taken. These estimations were verified by the weight of the content of serving-dishes before and after the meal and the leftovers on the individual plates. Therefore the dieticians could not be blinded for the intervention. During the rest of the day the energy intake observation method stayed the same. We considered to put weight balances under the resident's plates, to measure the precise amount food residents took on their plate. Still, the dieticians should be present to observe which food residents took and the present of a weight balances on each residents plate could interfere with the normal eating behaviour of the residents. In conclusion we hold the view that the chosen strategy for food intake recording was reliable and valid, considering the type of intervention and the population.

Mini Nutritional Assessment (MNA)

The MNA is developed and validated especially to evaluate the risk of malnutrition and takes into account different predictors of malnutrition: anthropometric (weight, height and weight loss), global, dietary and subjective data.⁷ The sensitivity of the MNA classification of residents scoring less than 17 points in comparison with albumin levels and energy intake vary from 27 % to 57 % and the specificity from 66% to 100%.⁸

In this frail population a high sensitivity of a nutritional screening tool is more important than a high specificity. An incorrectly classification of being well-nourished may have many negative consequences for a nursing home resident. The resident will not receive appropriated nutritional care and has a higher chance of a low quality of life, high risk on morbidity and mortality. In contrast, receiving extra nutritional care while not malnourished in this setting is more a preventive measure than over-treatment.

Based on the MNA, 14% of our study population was malnourished and 65% was at risk. These numbers are in congruence of a recent Dutch prevalence study.

This study estimated that 17 % of the Dutch nursing home residents is malnourished.

Dutch Quality of Life of Somatic Nursing Home Residents Questionnaire

Quality of life was assessed by the validated Dutch Quality of Life of Somatic Nursing Home Residents Questionnaire in a face-to-face interview.⁹ This questionnaire consists of five subscales: sensory functioning (Nottingham Health profile – pain, Erdman et al., 1993), physical functioning (Sickness Impact Profile 68 - physical autonomy, De Bruin, 1996¹⁰), psychosocial functioning (Philadelphia Geriatric Centre Morale Scale - self-perceived life satisfaction, Lawton 1975¹¹), perceived autonomy (van Campen et al. 1998⁹) and perceived safety (van Campen et al. 1998⁹). Each of these subscales presents a quality of life dimension. In total, the questionnaire consists of fifty statements that are scored on a dichotomous scale (yes or no). Each dimension and the total questionnaire can be computed to a range of 0 – 100 by multiplying with a factor of 100 divide by number of questions. A high score of quality of life questionnaire means a high quality of life. The internal consistency was measured by using the Kuder-Richardson formula 20 (KR-20), a Chronbach's alpha for dichotomous items. The reliability KR-20 values in this study ranged from 0.52 – 0.80 and are in accordance with those of van Campen et al. (1998) (0.50 – 0.82) and Holtkamp et al. (2000) (0.54-0.79).^{9 12} We consider this to be satisfactory within the context of this study.^{9 13} The population of van Campen et al (1998) consisted of three different Dutch patient categories: Long-stay residents with a cerebro vascular accident (n=115), revalidation residents (n= 61) and long stay residents with neurological disorders (n=57). The population of Holtkamp et al. (2000) consisted out of 337 long stay residents with a chronic somatic disorder of 10 different Dutch nursing homes. Both populations which are comparable to our population and therefore we may concluded that the quality of life outcomes are reliable and reproducible.

EXTERNAL VALIDITY

Generalizability

The major strength of this study is the real life setting in which this study was implemented and therefore it produces effective strategies to address interventions for malnutrition and low quality of life in nursing home residents. In contrast to artificial controlled settings, real life studies have to deal with multiple influences of the environment. Therefore results of this study do not only enable nursing home management and policy makers to identify the nutritional needs of nursing homes residents, but also give them best practice information to implement a more client oriented food services to prevent malnutrition.

By excluding residents with dementia, an important group of nursing home residents is missing. Earlier research showed that residents with dementia also benefit from these kind of interventions.¹⁴⁻¹⁸ Therefore, although the study population is not representative for nursing home residents with dementia, we think that the principal conclusion of this study may be extended to all nursing home residents. However this has to be confirmed by a long term controlled intervention study.

In the Netherlands, 80% of the nursing homes serves their meals based on a tray services system, which is also very common in other European countries.¹⁹ In the Netherlands it is common that residents have to order their meals two weeks ahead. We are aware that in other countries (UK, Scotland) care standards exists, which promote that residents should have the opportunity to select their own meal from a menu and this not more than two meals in advance.²⁰ Still, residents have to chose their meal ahead and not at mealtime itself. Literature suggests that over the whole world nursing homes have problems with serving the meals in an enjoyable setting.²¹⁻³⁶ We are aware of international differences and habits, but the results of this study can play a major role in national and international health care policy.

Malnutrition

Baseline energy intake (6.1MJ/day) of the residents is in accordance with earlier observations (Mathey 5.4 MJ/day and 6.1 MJ/day, Elmstålh 5.8 MJ/day). However, the observed effects of the interventions differed. During our study, mean energy intake in the intervention group increased significantly with 539 kJ and body weight changed accordingly. These changes were not observed in a study with residents with dementia.³⁷ Our increase in energy intake was smaller then the observed increases of Mathey (767kJ) and Elmståhl (1400kJ). In contrast to our observations, there was in both studies no statistically significant difference between groups for body weight. A third study, in which a buffet-style program was implemented had no effect, neither on body weight (p=0.638), nor on the biochemical markers of nutritional status of the residents (n=40). Unfortunately they did not measure food intake.²⁶ These differences might be due to methodological problems of the three latter studies. For instance, they did not correct for the group effect or their intervention period lasted only 3 months. The observed decline of body weight in the control group is in accordance with earlier observations.³⁸⁻⁴⁰ In a study of Morley and Kraenzel 19% of their subjects lost 5 pounds or more over a period of 6 months.³⁸

Other studies tried to improve nutritional status with special designed diets, supplements or exercise programs.⁴¹⁻⁴⁴ All of these interventions had a positive effect on daily energy intake, body weight, or MNA status. The advantage of our intervention is that we did not create a new task for the staff, but it was already embedded in the daily activity pattern. During the mealtimes the residents were given choices such as what to eat, they were stimulated to perform normal meal activities. They did not have to eat special designed supplements or diets.

Mini Nutritional Assessment

Based on the MNA, 78 % of these residents is at risk or is malnourished. On first sight this seems to be higher than in an earlier Dutch study and previous international research which used the MNA as nutritional parameter.^{8 45-47} Yet, some authors used a single focus parameter (weight loss) which narrows the definition of malnutrition other authors applied extensive exclusion criteria and therefore the proportion of malnourished residents refer only to the 'healthier' nursing home residents. Our high numbers of malnourishment are in resemblance with studies, which included all residents living on the ward and with studies which also included residents with dementia.^{48 49}

Quality of life

Considering the simple method of optimising the ambiance during mealtimes, the already rather low quality of life of the residents, and the limited prospect of revalidation or discharge the observed difference of 6 points (10%) quality of life is an important figure. Earlier research with the same questionnaire showed differences of 15 points (26%) of quality of life in nursing home residents between their admission to a stroke rehabilitation program and their discharge.⁵⁰ Studies with a more drastic intervention, coronary artery bypass graft surgery, had higher differences in physical functioning (25% vs. 13% in our study), social functioning (16% vs. 13% in our study) if we recalculated the estimates to proportions.⁵¹ However in an activity stimulating program for older community dwelling persons and a lay health mentoring in older persons with ischemic heart diseases the differences for physical functioning (6.1 and 5.4) were similar and were substantially lower for psychosocial functioning related aspects (0.4 and 4.4 vs. 7.4) to our study.^{52 53}

Other studies in nursing home residents focused on improving behavioural involvement, alertness, mood, personal responsibility and depression; all aspects of quality of life.⁵⁴⁻⁵⁷ Langer's study focused on an increased sense of control, for specific choices as plant watering and movie choice and timing. The residents in this study reported an improvement on well-being.⁵⁷ Also in the other studies additional activities were done to improve well-being.⁵⁴⁻⁵⁶

INFERENCE

Social facilitation effect

An important factor to explain the observed effect is the process of social facilitation; the enhancement of behaviour due to the sheer presence of others. The sights and sounds of others doing the same thing augment ongoing responses.⁵⁸ Meals in family style could encourage the feeling of having the meal in company and therefore residents ate more compared with having their meals in individual pre-plating services. Social facilitation of meal size is not only related to the number of others present, but also to the extension of meal duration and the more social atmosphere.⁵⁹ Besides the number of residents also specific company, such as family, friends and their nurses, may enhance energy intake.⁶⁰ The social interaction during these meals increased through the extra attention that residents got from the nurses who were sitting at the tables and who were instructed to stimulate conversations. Social facilitation of energy intake might be mediated by an extension of meal duration. Nursing staff and residents indicated that the atmosphere during meals was more relaxed and therefore it seems they had more time to dine. However we did not measure this effect. In this study we cannot say which part of the intervention protocol had the most impact on the residents.

In addition to the group effect, another variable may explain the increased food intake; residents might also experience an increase in the flexibility of offered amount of food. Their food was no longer limited to the fixed amount of their tray. Nutrition assistants were trained to order the same amounts they did before in the tray system and the food was now limited to the amount in the dishes, which is the sum of the individual trays of the number of residents sitting at the table. Besides the feeling of increased flexibility of amount of food, residents could choose their

food at the moment itself and had no more to order their food two weeks ahead. This could increase the feeling of having more choice and residents were allowed to take two kinds of vegetables e.g., instead of one. Recent research of Hetherington et al (2006) showed that variety may stimulate food intake, in part by delaying the development of satiation which extends eating and therefore the amount consumed.⁶¹ Only tasting another food could have this effect. However, in practice it did not occur frequently that residents chose two types of food groups. All these suggestions, besides the group effect, may lead to an increased food interest and therefore consumption.

Quality of life

The effect of the intervention on quality of life may be explained by the Social Production Function theory.⁶² Within this theory it is expressed that overall quality of life can be reached by using one's own preferred resources / activities.⁶² Mealtimes can be one of these activities. For example, dining out achieves internal comfort but it may also produce activation and affection. More important family style meals in nursing homes can be such a multi-functionally activity. It does not only achieves internal (hunger, thirst) and external comfort (pleasant environment), but also activation (level of arousal), status (being part of a small group), behavioural confirmation (from nurses and table company) and affection (attention from nurses and table company, help from others).

We observed a counteracting effect of the family style meals on the decline of quality of life. However we hoped for an increase of the resident's quality of life. Therefore we have to conclude although meals are of major importance for nursing home residents; it is not enough to empower their quality of life in general.

IMPLICATIONS FOR PUBLIC HEALTH

Residents as well as nursing home staff were enthusiastic and willing to continue the intervention after the completion of the study. After the intervention period the nursing homes continued serving the meals in the family style, not only in the intervention wards, but also in the control wards. This was done within the present context of limited financial resources. After some minor adaptations, the project is implemented in closed psycho-geriatric wards of three of the participating nursing homes. The staff is very enthusiastic about the results they observe.

Moreover there is an increasing interest of Dutch nursing homes to implement this project, which is met by a special established project team of a governmental institution (Nederlands Instituut voor Zorg en Welzijn: www.zorgvoorbeter.nl), in which the author is participating.

After the implementation of the Ambiance project one staff member of each intervention ward was responsible for the correct implementation of the project. In general there were no major problems. These 'ambiance experts' expressed the importance to inform new staff members about the different meal services. There were some minor instruction problems in the beginning.

RECOMMENDATIONS FOR HEALTH CARE INSTITUTIONS

Based on the results and the experiences of the above mentioned studies we recommend

That the residents' nutritional status will be screened each three months in a structured way. This can be done by an appetite questionnaire (SNAQ), body weight graphs or by the screening part of the MNA (MNA-SF).^{63 64} Special attention has to go to the embedment of the screening in daily care. A recent study showed that this easily could be done by a simple appetite questionnaire which predicts weight loss in nursing home residents.⁶⁴ We give preference to the SNAQ because it can predict weight loss in nursing homes, which is already a sign of malnutrition

To stimulate nursing staff awareness' of risk factors of malnutrition (loss of appetite, acute illness, multi-pharmaca use), knowledge of first signs of malnutrition, consequences and prevention of malnutrition by education and health promotion.^{48 49} This can be reached by workshops given by the nursing home dietician of nurse experts. Management of nursing homes should stimulate and facilitate their nurses to go to 'nutrition and elderly' symposia.

Nursing home management has to reconsider their view of meals as merely an expense to an investment in residents' health and quality of life, in such a way that other cost can be prevented.

SUGGESTIONS FOR FURTHER RESEARCH

The implementation of research results in practice

Although, of many nursing care topics, i.e. resident dependency, incontinence management and prevention of pressure sores, a substantive body of scientific evidence exist, practice utilization of these research findings are lacking in daily nursing home practice. Is there a mismatch between the researcher interest and the needs of the practitioners? Or is there a level missing between these two groups; a group of professionals who translate or interpret the research evidence in practice guidelines for nursing homes? Many other factors such as resources, healthcare provider's education and expertise, patient preference, the available research and change management issues play also an important role in the utilization of evidence based data. It would be worthwhile to investigate why there is still a lack of implementation of nursing research evidence and how this problem can be tackled to assure a high quality of care in Dutch nursing homes.

The effect of the ambiance project on residents with dementia

In this thesis we focused on the nursing home residents with a chronic somatic disorder. We think that residents with dementia could even benefit more of these kind of interventions during mealtimes. The positive results from music therapy, 'snoezelen', sensory stimulation and 'normalized' care stimulate us in these thoughts. Residents with dementia can have a declined recognition ability of meals or other events. Family style meals might offer them a well outlined framework and meals are sooner recognized as the moment to eat. This could be reached not only

by the changing of the ambiance but also by the actions which announce the meal, such as table setting.

The effect of daytime on food intake

One of the unexpected observations was that family style meals tend to increase food intake during the evening bread meal and only counteract the decline of intake during the cooked meal. Different suggestions may explain this outcome. For example residents are tired at lunch time from the many care activities in the morning and prior to the evening bread meal there are no intensive care activities. Others state that residents have a more pronounced preference for bread meals than for cooked meal. Further research is needed to clarify if residents prefer bread meals above cooked meals or that the energy intakes are time-related.

Social facilitation

Many aspects of the social facilitation effect are still unclear. Our results suggest that social facilitation can not only be explained by the fact of not eating alone or eating in group. Some of the residents already had their meals together. The implementation of the family style meals introduced not only eating together; it also renewed social contact between residents and between resident and staff. Hence it might be that social facilitation is more than the effect of eating in group. Is social facilitation more an effect of the group interaction, the attention someone during the meals receives? Is the social interaction effect during meals on food intake more important than the number of table company or meal duration?

GENERAL CONCLUSION

This study and many indications from other studies stress that we can no longer assume that malnutrition is only a problem for terminal ill and demented nursing home residents. Structural and adequate intervention is needed by dietary changes, such as extra snacks, fortified food, and liberalization of diet prescriptions but also by intervening in extra feeding assistance and stimulating food services.^{40 65} Therefore it is recommended that on organizational level all nursing homes adjust their food system to a more resident friendly system and on individual level each nursing home resident has an individualized nutrition plan, which describes residents' food preferences and wishes and includes structural nutritional monitor moments by professionals.^{25 66}

There are many different ways of improving foodservices: restaurant, meals prepared by the residents and wait-staff service.⁶⁷⁻⁶⁹ The challenge is to acknowledge residents' wishes through patient oriented, rather than organisationally oriented meal procedures, and link physical status to food and food services.⁶⁹

The meal ambiance project provides a cost and labour efficient intervention that has a beneficial effect on the nutritional status, the quality of life, the physical performance and body weight of nursing home residents. The enthusiasm of the residents and nursing staff convinced the management teams and nursing home boards to proceed with the projects and to implement the program also in other wards.

Like in most countries, Dutch nursing homes are limited in personnel and financial budget. Therefore we had to design an intervention protocol that did not need extra personnel or would either increase the workload of the nurse or the costs

of the meal. The financial costs were limited to buying the required materials such as tablecloths and dishes. Since the organizational structure of meal services in Europe and the USA is quite similar to the Dutch setting, it is worthwhile to change the individual pre-plating services to family style meals.

In all 5 nursing homes the project was continued in both the intervention was implemented in the control and other wards. The project was also successfully implemented in closed psycho-geriatric wards after minor adaptations. These outcomes prove that the feasibility of the project is not only limited to a selected group of residents.

In summary, based on the positive effects of the ambiance project for both the residents and nursing staff we recommend replacement of the pre-plating meal services with family style meals in nursing homes.

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SUMMARY

Recently, a nationwide Dutch prevalence study estimated that 17 % of the Dutch nursing home residents is malnourished and 22 % is at risk for malnutrition. Worldwide prevalence of malnutrition among elderly living in nursing homes is estimated between 17 % up to 65 %. Moreover due to their increased dependence for care of others, nursing home residents are at risk for a low quality of life.

In the Netherlands, the currently used individually pre-plated meal services in nursing homes may have an important negative influence on food intake of nursing home residents. Residents receive their entire meal on a tray and often their main course is served on a pre-divided plate. Depending on the resident's preference, they have their meal in a common dining room or in their own room. This meal services practice, in absence of a pleasant environment, does not stimulate residents' appetite and meal enjoyment. The combination of a decreased appetite and insufficient food intake can lead to unintentional weight loss, malnutrition and a decrease of general well-being of the nursing home resident. Moreover, malnutrition has serious negative consequences, such as a higher prevalence of infections, hospitalisation, dysfunctions and an increased morbidity and mortality.

Research showed that elderly subjects' food intake regulation is less sensitive for appetite, but they are still responsive to environmental stimuli (social facilitation). Therefore changes in meal ambiance could induce desired alterations in the nutrient intake of the nursing home residents. Secondly, changing the meal ambiance in a more resident tailored care rather than task/organizational oriented care may stimulate resident's perceived autonomy, perceived control, self-esteem, satisfaction and enjoyment and therefore indirectly stimulate general well-being of nursing home residents. Changing meal services implies that nursing staff has to change their daily routine and this may lead to hardship among the nurses.

With this in mind, we wanted to answer the following research questions:

How could we improve the ambiance during mealtimes and which are the incentives and barriers of these different strategies?

What is the mean energy intake of Dutch nursing home residents and how many residents are malnourished or at risk for malnourishment?

What is the effect of family style meals on quality of life among nursing home residents?

What is the effect of family style meals on food intake among nursing home residents and is this effect the same at all three main meals?

What is the effect of family style meals on food group intake among nursing home residents?

What is the effect of the implementation of family style meals on work satisfaction and workload of the staff?

To answer these questions we firstly performed an inventory of project strategies used in Dutch nursing homes to improve ambiance during mealtimes. Based on a semi-structured questionnaire, we identified the incentives and barriers that the nursing home staff experienced (**Chapter 3**). Secondly we conducted a cluster-randomized controlled trial in five Dutch nursing homes (**Chapter 2, 4-6**). Within each home, two wards were randomized in intervention and control group. In total, 242 residents with a chronic somatic disorder of ten long stay care wards were

included. Of the 242 residents, 94 (39%) were male, 51% had a stroke history and 75% were sitting in a wheelchair. During six months the intervention group had their meals in family style, and the control group received the usual individual pre-plating services. Outcome measures were energy intake (kJ), carbohydrate (g), fat (g) and protein intake (g) and Mini Nutritional Assessment score, body weight, quality of life, gross and fine motor function, and work related satisfaction of the staff (chapter 4-6). The baseline data of this intervention study are used to answer the research question on the prevalence of malnutrition in Dutch Nursing Homes (**Chapter 2**).

In Chapter 2 we observed food intake, nutritional status and biochemical health indicators residents of 5 Dutch nursing homes and examined the differences between the groups (at risk for) malnutrition and well-nourished according to the Mini Nutritional Assessment (MNA).

Based on the classification scores of the MNA 15.8% of the residents were malnourished, 62.2% were at risk for malnutrition and 22 % were well nourished. Of these residents, 35% had an energy intake below two-third of the RDA and high proportions of insufficient intakes ($< 2/3$ RDA) of vitamin B1, B6, folic acid and vitamin D were observed. On average the residents had sufficient intakes of dairy products, potatoes, cereals and meat (proteins), but an insufficient intake of vegetables, fruit, bread and beverages. There were no differences between the three MNA-groups. It is concluded that the dietary intake and consequently the nutritional status in long stay nursing home residents with a chronic disorder, is insufficient.

In the inventory study (**Chapter 3**) we revealed three different meal ambiance strategies: restaurant, cooking on the nursing ward and meals served in family style. Each of the three strategies was experienced as a success by the nursing home residents, the management and the staff. They pointed out that the cooperation and motivation of staff, sufficiently sized space and management support were the most important beneficial factors of the project strategies. The most important barriers of the project strategies were absence of cooperation and motivation of the staff, insufficient finances and insufficient personnel.

We further investigated the impact of family style meals on quality of life (**Chapter 4**), nutritional status (**Chapter 5 and 6**) and staff workload (**Chapter 6**) in the cluster-randomized controlled trial. Of the 242 residents, 178 residents completed the study (intervention group= 95, control group= 83). The results showed that family style meals counteracted a decrease in quality of life, more specific in physical functioning, psychosocial functioning and perceived safety. Moreover family style meals maintain physical performance and bodyweight of the nursing home residents. This trial demonstrated also that changing the meal services from individual pre-plating services to family style meals had a beneficial effect on the food intake (energy and macronutrients) and that the extra intake of energy was not caused by one particular food, but the increased energy was induced by small increased intakes of all food groups. Additionally, family style meals had a beneficial effect on the food intake during the cooked meal and the bread meal, but not during breakfast. We also observed a decrease of the percentage of residents in the intervention group classified by the MNA as malnourished from 17 % to 4% while this percentage increased from 11 % to 23% in the control group. Furthermore this study showed that ward staff was satisfied with the

implementation of the ambiance project and the new meal services did not increase their workload in general.

The main findings from these studies are summarized and discussed in the general discussion (**Chapter 7**). Firstly, we reflect on several methodological considerations of our intervention study, such as the comparability of the nursing homes, the study population, study design and the outcome measures. Secondly we discussed the generalizability of the study outcomes, more precisely the importance of the real life situation in which this study was performed. Thirdly we interpret the observed effects in relation to the findings of others and speculate on the possible explanations of the observed effects. An important factor to explain the observed effect of food intake is the process of social facilitation which is induced by serving meals in family style meals. In this thesis we showed that meals have besides the nutritional aspects also an important role in the good life of residents. We conclude that family style meals provide a cost and labour efficient intervention that has a beneficial effect on the nutritional status, the quality of life, the physical performance and body weight of nursing home residents. Therefore we recommend replacement of the pre-plating meals services with family style meals in nursing homes.

SAMENVATTING

Deze 'Nederlandse samenvatting' is geschreven voor niet-wetenschappelijk publiek.

DE MAALTIJD IN HET VERPLEEGHUIS:

“GEZELLIGHEID DOET ETEN?!”

In 1999 verscheen het rapport: ‘Vocht- en voedselvoorziening in de Nederlandse verpleeghuizen: beleid en praktijk’ van Inspectie voor de gezondheidszorg. Eén van de opmerkelijke conclusies van dit rapport was dat de wijze van opdienen en gebruik van de maaltijden in de Nederlandse verpleeghuizen doorgaans geen sociaal gebeuren is, omdat de huiselijkheid en gezelligheid tijdens het eten dikwijls ontbreken. In 80% van de Nederlandse verpleeghuizen wordt de maaltijd geproportioneerd opgediend. Dit houdt in dat de volledige maaltijd op één dienblad aangeboden wordt aan de bewoners en dat de warme maaltijd uitgeserveerd wordt op een drievakbord. De bewoner kan meestal kiezen of hij op zijn kamer eet of in de gemeenschappelijke zitkamer van de verpleegafdeling. Deze wijze van opdienen gecombineerd met een ongezellige omgeving werkt niet stimulerend op de eetlust en het eetgenot en doet afbreuk aan de sociale functies van de maaltijd. Een combinatie van een slechte eetlust en een zorgelijke voedingstoestand kan leiden tot ongewenst gewichtverlies en ondervoeding, maar ook tot een hogere morbiditeit, een hogere mortaliteit en een lagere kwaliteit van leven.

Dat een gezellige sfeer tijdens de maaltijd een positief effect heeft op de voedselinname van de bewoners bewezen Mathey en collega’s. In hun onderzoek werden verschillende maatregelen genomen om maaltijden in een Bredaas verpleeghuis gezelliger te maken. Dit leidde tot een gewichtstoename van gemiddeld 3,3 kg. Bovendien bleef het welzijn van de bewoners gedurende een periode van 12 maanden op peil. Op basis van deze gegevens hebben wij een onderzoek opgezet met als doel de voedingstatus en de kwaliteit van leven van verpleeghuisbewoners te verbeteren door de ambiance tijdens de maaltijden in Nederlandse verpleeghuizen te optimaliseren.

Om dit doel te bereiken zijn we eerst op zoek gegaan naar succesvol geïmplementeerde maaltijdprojecten in Nederlandse verpleeghuizen en hebben we getracht de bijhorende bevorderende en belemmerende factoren te inventariseren (**Hoofdstuk 3**). De resultaten van de inventarisatie geven aan dat er drie verschillende soorten maaltijdprojecten zijn: een restaurant openen, koken op de afdeling, en een huiskamerambiance project.

Alledrie de projectvormen beïnvloeden de maaltijdambiance positief. Ze werden zowel door de bewoners, het management als het personeel als succesvol ervaren. Goede medewerking en motivatie van het personeel, voldoende ruimte en management ondersteuning werden aangeduid als bevorderende factoren. Belemmerende factoren waren echter afwezigheid van motivatie en medewerking van het personeel, onvoldoende financiën en personeelstekort.

Op basis van de resultaten van dit onderzoek hebben we het ‘huiskamerambiance model’ geïmplementeerd in vijf verpleeghuizen (**Hoofdstukken 2, 4-6**). In elk verpleeghuis was een controle- en interventieafdeling. Gedurende zes maanden werden de maaltijden in de interventieafdeling uitgeserveerd in dekschalen met behoud van menukeuze. Dit betekent dat er voor alle maaltijdcomponenten keuze was uit twee soorten. De maaltijd werd door de bewoners genuttigd in de gemeenschappelijke zitkamer, waardoor voor iedereen de maaltijd op hetzelfde

moment begint en eindigt. De tafels werden volledig gedekt met tafellakens, servetten, volledig bestek, glazen en porseleinen servies. Aan het verzorgende personeel werd gevraagd om bij de bewoners aan tafel te gaan zitten en zo weinig mogelijk rond te lopen tijdens de maaltijd. Ook werden alle nevenactiviteiten tijdens de maaltijd geweerd, zoals het uitdelen van medicatie, schoonmaakactiviteiten en de ronde van de arts. De controleafdeling behield het dienblad met de geproportioneerde maaltijd. Bij alle bewoners werd de inname van energie (kJ), koolhydraten (g), vet (g) en eiwit gemeten alsook het risico op ondervoeding (op basis van de 'Mini Nutritional Assessment'score), het lichaamsgewicht, de kwaliteit van leven, en de grove en fijne motoriek. Het verzorgende personeel van de interventieafdeling werd gevraagd deel te nemen aan een werktevredenheidsonderzoek.

Bij de start van het onderzoek includeerden we 242 bewoners met een chronische aandoening in het onderzoek. Hun gemiddelde leeftijd was 77 jaar, 39% man was, 51% had een beroerte gehad en 75% zat in een rolstoel. Verder was 16% van de bewoners ondervoed, 62% had een verhoogd risico op ondervoeding en 22% had een bevredigende voedingsstatus. Aan het begin van het onderzoek was de energie-inname bij 35% van de bewoners lager dan 2/3 van de aanbevolen hoeveelheid en velen hadden een te lage inname van vitamine B1, B6, foliumzuur en vitamine D. De bewoners aten wel voldoende melkproducten, aardappelen, granen en vlees, maar aten te weinig groenten, fruit, brood en vocht.

In het totaal voltooiden 178 bewoners de interventie periode van 6 maanden. Hierbij kon worden aangetoond dat het 'Ambiance project' een daling van de levenskwaliteit, fijne motoriek en gewicht van de bewoners tegenging. Daarnaast kunnen we aantonen dat het project een positief effect heeft op de voedselinname (energie en macronutriënten) en dat deze stijging niet te wijten is aan een inname van één specifiek voedingsmiddel, maar dat de gestegen energie inname verklaard moet worden vanuit een lichte stijging van alle voedingsmiddelen. Het 'Ambiance project' had een positieve invloed op zowel de broodmaaltijd als de warme maaltijd, maar niet op het ontbijt. Het percentage bewoners met ondervoeding in de interventieafdeling daalde van 17% tot 4%, terwijl deze in de controleafdeling steeg van 11% naar 23%. Het verzorgende personeel van de interventieafdeling gaf aan dat ze tevreden waren met de invoering van het 'Ambiance project' en dat hun werkdruk in het algemeen niet is gestegen.

Op basis van deze resultaten concluderen wij dat het 'Ambiance project' de kwaliteit van leven en de voedingsstatus van verpleeghuisbewoners verbetert zonder een toename in werkdruk van het verzorgende personeel. Daarom bevelen wij aan om het dienblad met de geproportioneerde maaltijd te vervangen met het huiskamerambiance model.

EDUCATIONAL PROGRAMME

Discipline Specific Activities

VLAG course 'Food perception and food preference', Wageningen, 2000
Universidad Complutense de Madrid congress 'Third European Congress on Nutrition and Health in the Elderly, Madrid, Spain, 2000
NVG congress '6th national gerontology congress' Veldhoven, 2002
Keesing Noordvliet symposium 'De beleving van de maaltijd', Amersfoort, 2002
Erasmus Universiteit Rotterdam seminar 'Voedingsbeleid in Instellingen' Rotterdam, 2002
UMC IIQM Seminar 'Design and implementation of qualitative research' Utrecht, 2002
VLAG congress 'Xth Food choice Conference', Wageningen, 2002
Danish Dietetic Association congress 'What became of the social meal?' Copenhagen, 2003
CaRe course 'Analysis of correlated data' Maastricht, 2004
VLAG course 'Master class Geriatric Nutrition' Wageningen, 2004
'European Congress on nutrition and health in the elderly', Toulouse, 2004
MINT course 'Aandacht voor de voeding in het verpleeghuis' Vaals, 2004-2005
NVG congress '9th national gerontology congress' Noordwijkerhout, 2005
IANA congress 'Aging and nutrition' Saint- Louis, 2005
WU-HNE symposium 'De maaltijd in het verpleeghuis: uitdaging of sluitpost?' Ede, 2005
Staatstoezicht op de volksgezondheid seminar 'Indicatoren van Veilige Zorg' Rotterdam, 2005

General Courses

VLAG PhD week, Bilthoven 2001
OWU course 'Organizing and supervising thesis work' Wageningen, 2002
CENTA course 'Scientific writing', Wageningen, 2004
ENLP 'European Nutrition Leadership Program', Luxembourg, 2005

Optional Courses and Activities

WU-HNE study tour, Italy – Swiss- Germany, 2001
WU-HNE study tour, Australia, 2004
WU-HNE meetings of Journal Club, 2000-2004
WU-HNE meetings of Oldsmobiles, 2000 - 2005

DANKWOORD

Dit proefschrift was niet tot stand gekomen zonder hulp van velen. Ik wil iedereen die, op wat voor wijze dan ook, aan dit proefschrift heeft bijgedragen hartelijk bedanken. In het bijzonder alle deelnemers uit de vijf verpleeghuizen die meededen aan het ‘Ambiance Project’. De bewoners vanwege hun bereidheid tot het beantwoorden van de vele vragen en het personeel voor hun inzet en enthousiasme bij het invoeren van het project.

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Andrea, Annet, Brian, Maaïke en Meike; we waren een geweldig team en samen hebben wij een erg mooie en interessante studie reis naar Australië georganiseerd. In het samenwerken naar dat doel heb ik veel van jullie geleerd. Daarnaast waren jullie een geweldige steun in de dagen na 15 april. Jullie aanwezigheid in Italië was subliem!

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Voor het verzamelen van voedselinneming data heb je diëtisten nodig. In mijn geval heel veel. Zelf schat ik het aantal op 15. Het aansturen en opleiden gebeurde gelukkig door een sterk team; Els, Ypie en Saskia; hartelijk dank daarvoor.

Naarmate meer instellingen meededen kon ik het data verzamelen niet meer alleen aan. Hierbij werd ik geholpen door Joël en Ariënné, maar ook door erg enthousiaste studenten; Linda, Marieke, en Diederike.

Naast alle support op het werk wil ik hier ook graag mijn familie en schoonfamilie bedanken voor hun niet aflatende belangstelling. Op jullie vraag wanneer ik ga afstuderen, kan ik eindelijk antwoorden: NU.

Lieve Niels, ik heb geprobeerd op te schrijven hoe belangrijk jou steun en begrip zijn geweest de afgelopen jaren. Na twee kantjes ben ik ermee gestopt. Jouw steun heeft niet geleid tot mijn proefschrift, maar naar dat van ons. Dank je wel... met jou aan mijn zijde is het me gelukt!

In de afgelopen jaren is me één ding duidelijk geworden... gelukkig behoor ik tot de 'kan-ik-wel' mensen!

A handwritten signature in black ink, appearing to be 'Kristel', with a stylized, cursive script.

Kristel

ABOUT THE AUTHOR

Kristel Nijs was born on January 3rd 1975, in Sint-Truiden, Belgium. In 1993, she passed secondary school at the 'Koninkelijke Atheneum' in Hasselt. In the next years she studied Nursing at the 'Katholieke Hogeschool Leuven' and obtained her BSc degree in Nursing in 1997. In the same year, she enrolled in Nursing Science at the Centre for Health Services and Nursing Research of the 'Katholieke Universiteit Leuven'. As a part of that study she conducted a research project on pain and bone marrow aspiration. In June 2000 she obtained the MSc degree, specialized in geriatric nursing. After these studies she started her PhD-project, which is described in this thesis. The research-project was conducted in cooperation with five nursing homes; 'De Volckaert' in Dongen; 'De Hazelaar' in Tilburg; 'Het Zonnehuis' in Doorn, 'Bloemendaal' in Gouda and 'Zorgcentrum Tilburg-Zuid' in Tilburg. During her PhD she attended several congresses and international courses within the education programme of the VLAG graduate school (Food Technology, Agrobiotechnology, Nutrition and Health Sciences). She was also member of the organization committee of the PhD-study Tour in 2003 to Australia and was selected for the 10th European Nutrition Leadership Programme in March 2004. At the end of her research she organized the conference: 'De maaltijd in het verpleeghuis: sluitpost of uitdaging?!', which was attended by 250 people. Since 2006 she is working as a Quality-of-Care consultant at the 'Rivierenland Ziekenhuis Tiel', which she combines with consulting the 'Verbetertraject: Eten en Drinken' of Zorg voor Beter (NIZW).

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- ❖ ZonMW

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Met dank aan:

Verpleeghuis ‘De Volckaert’ te Dongen

Verpleeghuis ‘De Hazelaar’ te Tilburg

Verpleeghuis ‘Zonnehuis Doorn’ te Doorn

Verpleeghuis ‘Bloemendaal’ te Gouda

Zorgcentrum Tilburg Zuid te Tilburg

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VOORWOORD

Dit draaiboek hebben wij in het kader van het ‘Ambiance’ promotie onderzoek geschreven. Tijdens dit onderzoek hebben wij heel wat ervaring opgedaan met de invoering van maaltijd veranderingen in verpleeghuizen. Met het schrijven van dit draaiboek willen wij deze ervaringen delen met éénieder die in zijn / haar instelling de maaltijden weer tot het hoogtepunt van de dag wil maken. Voorop in dit draaiboek staat dat het slagen van het ambiance project afhankelijk is van een grondige voorbereiding en een gemotiveerd projectteam dat samen dezelfde richting uit wil.

Het gehele proces van het implementeren van het ambiance project was een uitdagend proces waar de basisprincipes van veranderingsmanagement, vertrouwen en geduld centraal stonden. Uiteindelijk zijn alle 5 projecten een groot succes geworden en tot onze grote trots is het ambiance project nu in bijna alle vijf verpleeghuizen op alle afdelingen ingevoerd.

Dit draaiboek kon natuurlijk niet tot stand komen zonder hulp van de betrokken verpleeghuizen evenals hun erg enthousiaste medewerkers en bewoners.

Hartelijk dank voor jullie inzet!

Kristel Nijs en het WU ‘Ambiance-team’

INHOUDSOPGAVE

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DEEL 1: HET AMBIANCE PROJECT

1. Achtergrond

In 1999 verscheen het rapport: ‘Vocht- en voedselvoorziening in de Nederlandse verpleeghuizen: beleid en praktijk’ van de Inspectie voor de gezondheidszorg.¹ Een van de conclusies van dit rapport was dat de wijze van opdienen van de maaltijden in de Nederlandse verpleeghuizen in het algemeen geen sociaal gebeuren is, omdat de huiselijkheid en gezelligheid tijdens het eten dikwijls ontbreken. In 80% van de Nederlandse verpleeghuizen wordt de maaltijd geportioneerd opgediend. Dit houdt in dat de volledige maaltijd op één dienblad aangeboden wordt aan de bewoners en dat de warme maaltijd vaak uitgeserveerd wordt op een drievakbord. De bewoner kan meestal kiezen of hij op zijn kamer eet of in de gemeenschappelijke huiskamer van de verpleegafdeling. Deze wijze van opdienen gecombineerd met een minder gezellige omgeving werkt niet stimulerend op de eetlust en het eetgenot van de oudere en doet afbreuk aan de sociale functies van de maaltijd.

Daarnaast is de voedingstoestand van veel bewoners in Nederlandse verpleeghuizen zorgelijk.^{2,3} Uit onderzoek blijkt dat meer dan 50% van de bewoners een voeding met tekort aan wateroplosbare vitaminen (vitaminen van het B-complex en vitaminen C) krijgt en dat zeker 30% van de mensen bij opname ondervoed is.^{2,4} Een combinatie van een slechte eetlust en een zorgelijke voedingstoestand kan leiden tot ongewenst gewichtverlies en ondervoeding, maar ook tot een hogere morbiditeit, een hogere mortaliteit en een lagere kwaliteit van leven.⁴⁻⁸ Daarnaast komt ook ondervoeding voor in het verpleeghuis, maar dan wordt in draaiboek niet verder op ingegaan.⁹

Amerikaanse en Nederlandse studies laten zien dat de voedselinneming tijdens een maaltijd stijgt naarmate er meer ‘maaltijdgenoten’ zijn.^{10,11} Mensen eten meer in gezelschap van anderen dan wanneer ze alleen zijn. Dit verschijnsel wordt sociale facilitatie van eten genoemd en hangt samen met het feit dat een maaltijd in gezelschap van anderen langer duurt dan een maaltijd die alleen genuttigd wordt. Wanneer er anderen aanwezig zijn, is er vaak een aangename sfeer tijdens de maaltijd. Een tweede aspect van het nuttigen van de maaltijd is de fysieke omgeving waarin de maaltijd wordt gegeten. Zo smaakt identiek voedsel beter in een gezellig aandoende omgeving dan in een ongezellig aandoende omgeving.¹² Vanwege deze redenen is het verzorgen van een goede ambiance opgenomen in de multidisciplinaire richtlijn verantwoorde vocht- en voedselvoorziening voor verpleeghuisgeïndiceerden die Arcare ontwikkeld heeft.¹³

Dat een gezellige sfeer tijdens de maaltijd wel een effect zou kunnen hebben op de voedselname van verpleeghuisbewoners bewezen Mathey e.a. In hun onderzoek werden verschillende maatregelen ingevoerd om maaltijden in een verpleeghuis te Breda gezelliger te maken.²¹ Dit leidde tot een gewichtstoename van gemiddeld 3,3 kg en het op peil blijven van het welzijn van de cliënten gedurende een periode van 12 maanden.¹⁴

Deze resultaten wijzen erop dat het creëren van een gezellige, aangename sfeer tijdens de maaltijden in een verpleeghuis ten goede komt aan de voedingstatus en kwaliteit van leven van de bewoner.

2. Ambiance mogelijkheden

In eerder onderzoek werden er drie vormen van maaltijdambiance geïdentificeerd¹⁵:

- ❖ De maaltijd wordt verstrekt als in een restaurant.

De bewoners eten niet op de verpleegafdeling maar gaan voor de warme maaltijd naar het restaurant. De aankleding en de bediening zijn vergelijkbaar met een commercieel restaurant.

- ❖ De maaltijden worden samen met de bewoners op de afdeling gekookt.

De bewoners voeren kleine huishoudelijke taken, zoals het dekken van de tafels zelf uit.

- ❖ De maaltijden worden in een gemeenschappelijke huiskamer uitgeserveerd in dekschalen.

Meestal wordt deze manier van maaltijdvoorziening uitgebreid met een aangepaste aankleding van de omgeving. Zo ligt er een tafellaken op de tafel, zijn er servetten en staat er bloemetje op tafel.

Deze drie projectvormen werden zowel door de bewoners, het management als de medewerkers als succesvol ervaren.¹⁵ In dit draaiboek zal er alleen verder ingegaan worden op de laatste vorm van maaltijdambiance.

3. Beschrijving en ervaringen van het onderzoek

Dit draaiboek is gebaseerd op de ervaringen voortvloeiend uit de implementatie van de maaltijdambiance vorm 'dekschalen', hier verder genoemd 'huiskamer ambiance'. Dit project is geïmplementeerd in vijf verpleeghuizen op een afdeling voor bewoners met een chronische somatische aandoening.

De grootste verandering voor de verpleegafdeling was de wijze van het serveren van de maaltijd. De maaltijd werd geserveerd in dekschalen met behoud van menukeuze. Dit betekent dat er voor alle maaltijdcomponenten keuze was uit twee soorten. De maaltijd werd door de bewoners genuttigd in de gemeenschappelijk huiskamer, waardoor voor iedereen de maaltijd op hetzelfde moment begint en eindigt. De tafels werden volledig gedekt met tafellakens, servetten, volledig bestek, glazen en porseleinen servies. Aan het verzorgend personeel werd gevraagd om bij de bewoners aan tafel te gaan zitten en zo weinig mogelijk rond te lopen tijdens de maaltijd. Ook werden alle nevenactiviteiten tijdens de maaltijd geweerd, zoals het uitdelen van medicatie, schoonmaakactiviteiten en de ronde van de arts.

De bewoners, het verzorgend personeel en het management van deze verpleeghuizen zijn zeer enthousiast over de veranderingen. Alle vijf verpleeghuisafdelingen hebben deze nieuwe maaltijdvoorziening ook na het project behouden, maar ook de andere afdelingen van alle 5 verpleeghuizen zijn aan de slag gegaan om dit project ook bij hen in te voeren.

4. Doel van het project

Het doel van dit project is om de ambiance tijdens de maaltijden in het verpleeghuis te optimaliseren en zo de voedingsstatus en het welzijn van de bewoners positief te beïnvloeden.

Het project sluit aan op de multidisciplinaire richtlijn verantwoorde vocht- en voedselvoorziening voor verpleeghuisgeïndiceerden, zoals in 2001 is ontwikkeld door Arcare samen met professionals en cliëntenorganisatie. Het draaiboek werkt één van de facetten, nl. ambiance, verder uit.

5. Omschrijving van het ambiance project

Onderstaande beschrijving geeft het model weer zoals dat gebruikt is om de effectiviteit van maaltijdambiance wetenschappelijk te testen en te onderbouwen. Het is aan de instelling die met het project gaat werken om ervoor te kiezen het model in zijn geheel of bepaalde onderdelen ervan in te voeren. De verdere uitwerking van dit draaiboek is gebaseerd op de invoering van het gehele model.

Tabel 1. Projectomschrijving

ONDERDEEL	BESCHRIJVING
Maaltijd-voorziening	<ul style="list-style-type: none"> ▪ De warme maaltijd wordt in schalen op de tafel uitgeserveerd. De bewoner kan zien en kiezen wat hij op zijn bord wil. (= geen menulijsten meer) ▪ Keuze uit twee groenten, vlees en aardappelen. ▪ Broodmaaltijden: bewoners kunnen zelf kiezen wat ze op hun brood willen. Geen op voorhand gesmeerde boterhammen.
Aankleding	<ul style="list-style-type: none"> ▪ Tafellaken op tafel ▪ Glazen (geen plastic bekertjes) ▪ Normale borden (geen drievakbord) ▪ Volledig bestek ▪ Plantje of bloempje ▪ Achtergrondmuziek ▪ Servetten, er wordt als ‘slab’ enkel het daarvoor bedoelde materiaal gebruikt ▪ Afhankelijk van de cultuur / religie wordt er een momentje stilte gevraagd voor en na de maaltijden
Bewoners	<ul style="list-style-type: none"> ▪ Geef bewoners de keuze waar ze willen zitten ▪ Er wordt pas gestart met de maaltijd wanneer iedereen aan tafel zit ▪ Bewoners worden niet gestoord tijdens de maaltijden ▪ Bewoners krijgen alleen een ‘slab’ om wanneer bewoner dit wil
Personeel	<ul style="list-style-type: none"> ▪ Een verzorgende / voedingsassistent / vrijwilliger zit mee aan tafel ▪ Personeel vraagt bewust wat de bewoner wil eten, er wordt niet uitgegaan van ‘gewoonlijk’ ▪ Hetzelfde personeel blijft aanwezig gedurende de hele maaltijd, geen personeelwisseling ten gevolge van de lunchpauze ▪ De medewerkers is tijdens de maaltijd actief betrokken met wat er aan tafel gebeurt ▪ De medewerkers deelt medicatie vóór de maaltijd uit
Ruimte	<ul style="list-style-type: none"> ▪ Geen ander activiteiten dan het eten in de huiskamer tijdens de maaltijd ▪ Tijdens de maaltijd is de ruimte afgesloten voor familie en andere disciplines uitzondering: wanneer het noodzakelijk is de bewoner te observeren tijdens de maaltijd of wanneer familie helpt tijdens de maaltijd. In beide gevallen zal de persoon aanwezig zijn bij aanvang van de maaltijd en blijft tot het einde van de maaltijd. ▪ Gedurende maaltijden staan de maaltijdkarren, medicijnkarren, dossierkar, lege rolstoelen en rollators uit het zicht van de bewoners ▪ Direct na de maaltijd wordt alles opgeruimd ▪ Voldoende verlichting is noodzakelijk

6. Algemene aanbevelingen

Gefaseerd invoeren van het project heeft het voordeel dat door de intensieve samenwerking tussen de overkoepelende werkgroep en de werkvloer / uitvoerende partij valkuilen, problemen meteen duidelijk worden, en aangepakt kunnen worden voordat de hele instelling er mee te maken krijgt.

Een te uitgebreide gefaseerde invoering kan leiden tot een erg lange (in tijd) invoering van de veranderingen, wat dan weer veranderingsmoeheid meebrengt.

Conclusie: Eén of twee afdelingen als proef en dan de hele instelling veranderen.

6.1 Projectvoorwaarden

Tabel 2. Bevorderende en belemmerende factoren invullen

BEVORDERENDE FACTOREN	BELEMMERENDE FACTOREN
<ul style="list-style-type: none">▪ Medewerking, motivatie en tevredenheid van de medewerkers▪ Ondersteuning van het management▪ Voldoende personeel▪ Geschikt materiaal	<ul style="list-style-type: none">▪ Personeelstekort▪ Afwezigheid motivatie en medewerking▪ Tekort aan financiën▪ Materiaal tekort▪ Ruimtegebrek

6.2 Personeel specifiek

In het behoud en de uitvoering van het ambianceproject spelen de medewerkers een belangrijk rol.¹⁶⁻¹⁹

De volgende factoren werken bevorderend voor werktevredenheid¹⁶:

- ❖ Het werken met en het helpen van patiënten
- ❖ Het bijdragen aan een team
- ❖ Het omgaan met collega's
- ❖ Daarnaast leiden de volgende factoren vaak tot ontevredenheid¹⁷:
- ❖ Het gebrek aan controle en beslissingsbevoegdheid
- ❖ Het gebrek aan communicatie en begrip tussen de verschillende disciplines binnen de instelling
- ❖ Het gebrek aan routinematig werken
- ❖ Het gebrek aan voldoende medewerkers met de juiste kennis en vaardigheden

DEEL 2: WERKDOCUMENTEN

De werkdocumenten zijn gebaseerd op de werkplannen en schema's die in het Ambiance Project zijn gebruikt. De taak- en schema-invullingen kunnen daardoor afwijken van uw instellingen. Hoe de maaltijd tot een feest gemaakt wordt, is gedeeltelijk afhankelijk van de instelling en zijn bewoners. De aangeboden werkdocumenten hebben als doel u daar in te ondersteunen.

Werkdocument 1. Actieplan

Dit actieplan is gebaseerd op de gebruikte actieplannen in het onderzoek. De actiepunten en hun doelen komen in al deze actieplannen voor, maar de invulling van de eindverantwoordelijke was veranderlijk. Het kan dus ook zijn dat in uw stelling de genoemde functies niet aanwezig zijn en dat anderen dan genoemd de eindverantwoordelijkheid op zich nemen.

Tabel 3. Actieplan

ACTIE	DOEL	EIND VERANT- WOORDELIJK	OPMERKING
WEEK 1			
Bijeenkomst initiatiefnemers	<ul style="list-style-type: none">▪ Inventariseren van de verschillende verwachtingen▪ Duidelijk en helder doel afspreken▪ Bepaal welke acties je gaat doorvoeren en tijdslijn▪ Samenstellen werkgroep en kiezen voorzitter		
WEEK 2			
Oriënterend gesprek initiatiefnemers en directie / management	Wensen kenbaar maken en afspraken maken over de mogelijkheden	Voorzitter van de werkgroep	

ACTIE	DOEL	EIND VERANT- WOORDELIJK	OPMERKING
Eerste gesprek met overkoepelende werkgroep	<ul style="list-style-type: none"> ▪ Inventarisatie huidige situatie ▪ Uitwerken van veranderingen op de afdelingen en de keuken ▪ Uitwerken te ondernemen stappen ▪ Keuze maken tussen portioneren van de dekschalen in de keuken of op de afdeling 	<ul style="list-style-type: none"> ▪ Hoofd voeding ▪ Werkgroep ▪ Hoofd voeding en Zorgmanager ▪ Hoofd voeding en Zorgmanager 	
WEEK 3			
Overleg met cliëntenraad	<ul style="list-style-type: none"> ▪ Voorleggen van de gewenste verandering ▪ Toestemming verkrijgen 	Directie	De cliëntenraad heeft een verzwaard adviesrecht
WEEK 4			
Tweede gesprek met overkoepelende werkgroep	Te ondernemen stappen bespreken en benodigd materiaal inventariseren Opstellen van PR-plan	Hoofd voeding	
Inventarisatie benodigd materiaal op de afdelingen	Voldoende materiaal op de afdelingen	Zorgmanager / hoofd voeding	In overleg met voedingsassistenten
Inventarisatie benodigd materiaal keuken	Voldoende materiaal in de keuken	Hoofd voeding	In overleg met keukenpersoneel

ACTIE	DOEL	EIND VERANT- WOORDELIJK	OPMERKING
Inventarisatie verandering in logistiek	Overzicht creëren over te verwachten veranderingen in de logistiek	Facilitair manager	In overleg met logistiek verantwoordelijke
Bijeenkomst hoofd voeding en voedingsassistenten	Bespreken van: <ul style="list-style-type: none"> ▪ de veranderingen van aanleveren van de maaltijden ▪ benodigde materiaal ▪ het invullen van menulijsten 	Hoofd voeding	
Overleg Afdelings-hoofden	Doel duidelijk maken Wat zijn te verwachten veranderingen op de afdelingen Informereren en enthousiast maken	Zorgmanager	
Materiaal bestellen	Voldoende materiaal: <ul style="list-style-type: none"> ▪ Bain marie wagens ▪ Dekschalen ▪ Porselein/ servies ▪ Opscheplepels ▪ Tafellakens 	Facilitaire manager	De levertijd van sommige producten kan soms erg lang zijn

WEEK 5

Voorlichting verschillende disciplines vb. logopedie, fysiotherapie, ergotherapie ed. ...	<ul style="list-style-type: none"> ▪ Doel duidelijk maken ▪ Wat zijn te verwachten veranderingen op de afdelingen? ▪ Informeren en enthousiast maken 	Diëtist / Kwaliteitsmedewerker
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ACTIE	DOEL	EIND VERANT- WOORDELIJK	OPMERKING
Controle medische noodzakelijkheid van voorgeschreven diëten		Verpleeghuisarts	
Diëten controleren op noodzakelijkheid en consistentie		Diëtist	
Versturen van bewoners- infobrochures		Zorgmanager	In overleg met de cliëntenraad
WEEK 6			
Bekendmaking aan bewoners en bezoekers via nieuwsbrief		Diëtist / kwaliteitsmedewerker	De cliëntenraad kan hierbij een belangrijke rol spelen
Oplossen van individuele / cliënt gebonden eetproblemen		Diëtist	
Bewonersinformatie dag/avond		Zorgmanager/ afdelingshoofd	Organiseer een informatiemiddag op de afdeling zelf, bewoners, familie en verzorging zijn bekend met elkaar De cliëntenraad kan hierbij een belangrijke rol spelen

ACTIE	DOEL	EIND VERANT- WOORDELIJK	OPMERKING
WEEK 8			
Materiaal check		Hoofd voeding /zorgmanager	Minaal twee weken voor invoering van de verandering
WEEK 11			
Invoering van de verandering		Overkoepelende werkgroep	Zorg dat de dag vóór de invoering al het betrokken personeel aanwezig is, zodat 'laatste moment' problemen meteen opgelost kunnen worden
STRUCTUREEL			
Organiseer wekelijkse evaluaties	Opsporen van problemen en meteen intervenieren	Overkoepelende werkgroep	Snel en adequaat ingrijpen voorkomt onbegrip
Kwaliteit van de maaltijd		Diëtist / hoofdvoeding	
Tussentijdse evaluatie	Afnemen van vragenlijsten, verwerken en acties ondernemen	verpleeghuisarts/ diëtist	Na 3 maanden Bij alle betrokken partijen

Werkdocument 2. Overlegdiagram

Het overlegdiagram (fig.1) is opgesteld met als doel de overlegstructuur te verduidelijken. Er is geenszins een hiërarchie aan verbonden.

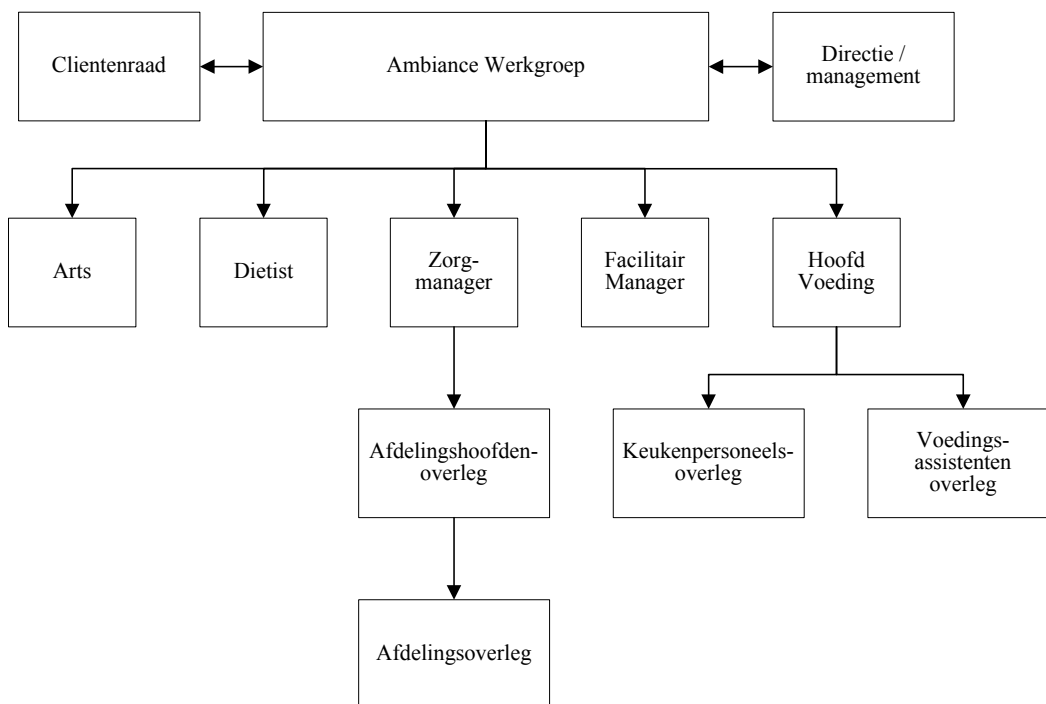


Fig1: 'Ambiance project'-overlegdiagram

De cliëntenraad en de directie/ management hebben in dit proces eerder een bewakende taak. Dit is geen vrijblijvende functie. De cliëntenraad volgt het gehele proces vanuit het standpunt van de cliënten en kan tevens een belangrijke taak op zich nemen in de informatie verstrekking naar de bewoners toe. De directie / management volgt het proces vanuit de visie van de instelling en zijn cliënten en treedt voorwaardenscheppend op (**Werkdocument 11**).

Werkdocument 3. De "Ambiance werkgroep"

De voorzitter

- ❖ De voorzitter verzorgt de communicatie met het management en met de rest van de instelling.
- ❖ De voorzitter moet voldoende beslissingbevoegdheid hebben om de benodigde veranderingen mogelijk te maken.

Samenstelling

- ❖ Enthousiastelingen / trekkers uit de verschillende verpleeghuisdisciplines met voldoende beslissingsbevoegdheid.
- ❖ Het is de bedoeling dat het multidisciplinaire karakter van het project tot uiting komt in de samenstelling van de overkoepelende werkgroep.

Noodzakelijk

- ❖ Zorgmanager: vertegenwoordigt de zorg en het werkveld
- ❖ Hoofd voeding: vertegenwoordigt de keuken
- ❖ Facilitair hoofd: vertegenwoordigt de logistiek
- ❖ Diëtist: advisering ten aanzien gevarieerde voeding en houdt rekening met de voedingswaarde van de maaltijd, in het algemeen en voor individuele bewoners
- ❖ Arts: eindverantwoordelijke voor de zorg

Aanbevolen

- ❖ Kwaliteits- / beleidsmedewerker
- ❖ Vertegenwoordiger van de cliëntenraad
- ❖ Voedingsassistent

Taken

- ❖ Heldere en duidelijke doelomschrijving
- ❖ Stappenplan met tijdsplan opmaken aangepast aan de instelling
- ❖ Inventarisatie huidige situatie
- ❖ Rapportage naar de directie
- ❖ Rapportage naar de cliëntenraad
- ❖ Aansturen van de uitvoerders c.q. de werkvloer
- ❖ Bewoners informeren (kan ook afdelingsniveau)
- ❖ Terugkoppeling / evaluatie
- ❖ Daadkrachtige en snelle reactie bij klachten en problemen
- ❖ Op de hoogte brengen van de niet-direct betrokken disciplines

Randvoorwaarden

- ❖ De leden van de overkoepelende werkgroep zijn in tijd vrijgesteld om de taken en de voorbereiding ervan te kunnen uitvoeren.
- ❖ De leden worden in staat gesteld om bijscholing of relevante symposia te volgen.
- ❖ De werkgroep krijgt voldoende materialen en middelen ter beschikking om de taken naar behoren uit te voeren.

Werkdocument 4. Afdelingshoofdenoverleg

Samenstelling

- ❖ Voorzitter: zorgmanager
- ❖ Alle afdelingshoofden

Taken

- ❖ Doel van de verandering toelichten
- ❖ Toelichten wat de te verwachten veranderingen zijn op de afdeling
- ❖ Informeren en enthousiast maken van verzorgend personeel
- ❖ Inventariseren welk materiaal nodig is op de afdelingen (tafellakens, voldoende porselein en bestek, bloemen)

Werkdocument 5. Afdelingsoverleg

Samenstelling (Minimaal)

- ❖ Afdelingshoofd
- ❖ 2 Eerste Verantwoordelijke Verzorgenden (EVV'er)
- ❖ Alle voedingsassistent(en) (VA)

Taken Zorg

- ❖ Inventarisatie gevolgen voor de afdeling (tijdstip maaltijd, voldoende personeel tijdens de maaltijd, tafeldekken, bewoners begeleiden, tafels afruimen)
- ❖ Passend maken in gehele zorgschema
- ❖ Opstellen werkschema

Taken Voedingsassistent

- ❖ Coördineert de maaltijden op de afdeling:
- ❖ Uitscheppen van het eten,
- ❖ Verdelen over de tafels
- ❖ Eten bestellen
- ❖ Afruimschema
- ❖ Menulijsten invullen

Aanbevolen

- ❖ VA wordt coördinator / aanspreekpunt van de maaltijdorganisatie
- ❖ Goed contact met de keuken
- ❖ Voor de start moet duidelijk zijn hoe de maaltijdlijsten ingevuld moeten worden
- ❖ Controleert de menucombinaties, zodat er geen rare combinaties naar de afdeling komen
- ❖ Vult samen met de bewoners de maaltijdlijsten in
- ❖ In beginperiode lijst op de afdeling leggen om positieve en negatieve punten op te schrijven.
- ❖ De negatieve punten zo snel mogelijk / direct bespreken en verbeteren.

Werkdocument 6. Keukenpersoneeloverleg

(In samenwerking met B. van den Brandt en E. van Herck, Zorgcentrum Tilburg Zuid)

Samenstelling

- ❖ Hoofd voeding en keukenpersoneel

Taken

- ❖ Praktische invulling in de keuken
- ❖ Verandering in takenpakket: portioneren van individueel tot afdeling (bain marie wagen) of per dekschaal.
- ❖ Aanschaf van benodigd materiaal; extra opschepmateriaal (pollepels, schuimspanen, vleestangen), bain marie wagens plus inhoud (bain marie bakken, deksels) dekschalen, opscheplepels voor op tafel.

Nieuwe taken voor het keukenpersoneel

- ❖ De taakverandering is het grootst voor de portioneerders. In het individueel portioneer proces zijn er meer en gedurende een langere periode portioneerders nodig. Na de verandering krijgen deze mensen een andere taakinfilling, voorbeeld: keuken assistent met als taak portioneren..
- ❖ Het afwassysteem plus logistieke traject aanpassen in verband met de extra schalen.
- ❖ Etiketten maken voor op de bain marie wagens, zodat zichtbaar is voor iedereen wat erin zit.
- ❖ Menukeuzelijsten aanpassen voor grotere hoeveelheden

Geen verandering

- ❖ Kookopdracht
- ❖ Bestelopdracht
- ❖ Transport van de wagens

Aandachtspunten

- ❖ Schep duidelijkheid in taken; zet de werkzaamheden op papier
- ❖ De medewerkers heeft blijvend sturing nodig; organiseer daarvoor regelmatig bijeenkomsten met de koks, afwashulpen en de portioneerders
- ❖ De vele verschillende diëten kunnen leiden tot te kleine porties voor de bain marie wagens. Een oplossing is om ze al in de keuken in een schaalte te doen. Of toch per persoon te portioneren, evt. alleen de afwijkende gerechten zodat de rest gewoon van tafel gegeten kan worden.
- ❖ De noodzakelijkheid van de diëten met de diëtiste overleggen. In een homogene groep van diëten is dit geen probleem.

Werkdocument 7. Hoofd voeding – voedingsassistenten overleg

Samenstelling

- ❖ Hoofd voeding en alle deelnemende voedingsassistenten

Taken

Bespreken van...

- ❖ ... de veranderingen van aanleveren van de maaltijden
- ❖ ... benodigd materiaal
- ❖ ... het invullen van menulijsten

Werkdocument 8. Vaak voorkomende problemen

De onderstaande genoemde problemen zijn de problemen die in elk van de 5 projectverpleeghuizen voorkwamen en met daarbij al eventuele oplossingen. Men moet er op bedacht blijven dat zich steeds situatie afhankelijke problemen kunnen voordoen.

8.1 Het bestellen van het eten

Probleem 1

- ❖ Er komen soms rare / verkeerde combinaties van maaltijdcomponenten naar de afdeling.
- ❖ Soms is er veel te veel eten, en dan weer eens te weinig.

Voorbeeld oplossing

Voedingsassistent vult per week een maaltijdlijst in, dit kan in overleg met de bewoners. Op deze lijst wordt aangeduid hoeveel men verwacht van elke maaltijdcomponent nodig te hebben. In het begin wordt een kopie van de bestelling op de afdeling bewaard. Zo behoudt de voedingsassistent het overzicht op wat er is besteld en hoeveel.

Probleem 2

- ❖ Er kunnen specifieke diëten/ gewijzigde consistenties nodig zijn.

Voorbeeld oplossing

Als gemalen eten nodig is voor een enkeling, kan dat in een schaal aangeleverd worden en dit vanaf een serveerwagentje aangeboden worden. Een specifiek dieet kan op een dienblad aangeleverd worden; op de afdeling kan bord van het dienblad gehaald worden. Het nadeel is dan wel dat de bewoner geen keuze heeft aan tafel.

Probleem 3

- ❖ Bewoner geeft voorkeur aan om op eigen kamer te eten.
- ❖ Bewoners eten op hun kamer t.g.v. ziekte.

Voorbeeld oplossing

Ook deze bewoners kunnen kiezen wat ze willen. De voedingsassistent of verzorgende vertelt wat er is en de bewoner kan dan kiezen. Voor bewoners die uitzonderlijk op hun kamer eten is het aan te raden dit tijdig door te geven aan de voedingsassistent of verantwoordelijke.

8.2 Temperatuur van het eten

Probleem

- ❖ Het eten koelt vrij snel af, wanneer de bewoners het op hun bord hebben.
- ❖ Doordat er beperkt gemalen vlees in de bain marie wagen zit, koekt het t.g.v. van de warmte aan in de bak.

Voorbeeld oplossing

Er bestaan bain marie wagens met onder in een warmhoudkast. Deze kast bereikt dikwijls de temperatuur van 40°C. Het servies en de dekschalen kunnen hierin gezet worden. Hierdoor wordt het servies opgewarmd en verliest het eten minder snel zijn warmte.

Om te voorkomen dat het gemalen vlees aankeekt in de bain marie bak kan men meer bestellen dan nodig is of de kleinste bak nemen.

8.3 Servies

Probleem

- ❖ Onvoldoende servies voor de bewoners.

Voorbeeld oplossing

Inventariseer bij het begin van het project hoeveel servies er aanwezig is en hoeveel er nodig is. Dit geldt ook voor de dekschalen.

8.4 Personeel

Probleem 1

Algemene afspraken verwateren voorbeelden:

- ❖ De medewerkers zijn snel geneigd van de ene tafel naar de andere tafel te lopen.
- ❖ Er wordt wel eens vergeten te wachten met het afruimen tot dat iedereen klaar is met eten.
- ❖ Tijdstip van vertrek van eerste groep voor lunch en terugkeer kan erg uitlopen.
- ❖ Personeel blijft soms te lang en met te velen rond de bain marie wagen staan i.p.v. bij de bewoners aan tafel te gaan zitten.

Voorbeeld oplossing

Om te voorkomen dat eerdere afspraken verwateren is het aan te raden dat één verzorgende blijft waken over de correcte uitvoering van deze wijze van maaltijd verstrekking. Deze persoon kan anderen aanspreken. Tevens moet elk nieuw personeelslid dat op de afdeling komt werken, bewust gemaakt worden van het doel en de manier van deze methode van maaltijdverstrekking.

Probleem 2

- ❖ Te weinig personeel tijdens de maaltijd

Voorbeeld oplossing

Dit probleem kan opgelost worden door de verroostering van het verzorgend personeel aan te passen. Zo kunnen de verzorgenden die ‘vroege’ ochtend dienst hebben voor de maaltijd gaan lunchen en de verzorgenden met een ‘late’ ochtend dienst na de maaltijd van de bewoners gaan lunchen. Ook bij de avondmaaltijden is een goede verroostering belangrijk.

Probleem 3

- ❖ Scepticisme en negatieve houding van de medewerkers

Voorbeeld oplossing

Een goede voorlichting en betrokkenheid van het verzorgend personeel speelt hierin een belangrijke rol. Het is belangrijk dat het doel van het hele project hun duidelijk is en dat daarnaast de hele uitwerking van wat er op de afdeling gaat veranderen met hen besproken en overlegd is. Het verzorgend personeel heeft vaak cruciale informatie over de haalbaarheid en de mogelijkheden op de afdeling. Hierdoor kunnen verwachte problemen vroegtijdig verholpen worden en krijgen criticasters minder kans.

8.5 Bewoners

Probleem

- ❖ Bewoners zijn / blijven onrustig

Voorbeeld oplossing

De eerste twee weken is dit normaal. Voor hen verandert er veel en dat vraagt toch tijd om zich aan te passen. Door een accuraat en rustig op treden van het verzorgend personeel valt heel wat onrust weg.

Belang van een goede bewonersinformatie; bewoners moeten weten wat hen te wachten staat en wat het doel van de veranderingen is.

Hebben de bewoners voor de start van de maaltijd...

- ❖ ... de kans gekregen om naar toilet te gaan?
- ❖ ... de medicatie uitgedeeld gekregen?

Werkdocument 9. Evaluatie

Na het invoeren van de verandering is het nuttig om regelmatig te evalueren. Dit bij zowel de medewerkers als bij de bewoners. Op deze wijze kunnen knelpunten en klachten gestructureerd in kaart worden gebracht en opgelost worden. Dit zowel op korte termijn, om de dagelijkse gang van zaken te garanderen, als op lange termijn, ter voorkoming van verwatering van het project.

9.1 Het ambiance project

Korte termijn

Een wekelijks vast moment om het project te overleggen, dit in de vorm van tafelgesprekken met de bewoners en evaluatiegesprekken met de medewerkers.

Lange termijn

Voor de start van het project een aantal evaluatiemomenten vast leggen, bijvoorbeeld na 3 maanden en na 6 maanden. Op de agenda ook een lijst van aandachtspunten zetten die aangedragen zijn door het 'werkveld'.

Verantwoordelijke

Zorg dat op iedere afdeling er een ambiance medewerker is, die het hele proces volgt. Deze kan dan als informatie verstrekker, procesbewaker en als alarmbel functioneren

9.2 De bewoners

Naast het bijhouden van de tevredenheid van de bewoners (zie bijlage3), kan ook het effect van het project op gezondheidsfactoren van de bewoners bijgehouden worden, zoals gewicht en ondervoedingrisico.

9.3 De medewerkers

De tevredenheid van de medewerkers is essentieel in de correcte uitvoering van het ambianceproject. In Bijlage 4 is er een uitgebreide vragenlijst toegevoegd.

Werkdocument 10. Financieel plaatje

VPH 1	EENMALIGE INVESTERINGEN	Bain marie wagen Terrines (6x2) TOTAAL €2786	€ 1800 € 192 € 324	incl. warmhoudkast €4200
		Sauciers (6x2) Opscheplepels Servies	€ 35 € 140 € 295	
VPH 2	STRUCTURELE KOSTEN	Bloemen	€ 1560	1x per week verversen
	TOTAAL € 4325	Overcapaciteit maaltijden Tafelkleden (6st)	€ 2465 € 300	10% meerkosten=3 maaltijden, prijs €2,25pst na 1 jaar versleten
	EENMALIGE INVESTERINGEN	Bain marie wagen Opscheplepels TOTAAL € 6000	€ 4000 € 200 € 1800	opdienschalen, vleesschotels en dessertschaaltjes
VPH 4	STRUCTURELE KOSTEN	Bloemen	€ 208	€ 4 per week
	TOTAAL € 858	Tafellinnen (6st)	€ 650	€ 12,5 waskosten per week
Opmerkingen: In deze instelling werden de maaltijden geleverd door 'Gouwe Cuisine'; zij leverden de maaltijden aan in dekschalen. Transportwagens en regeneerwagens waren al aanwezig in de instelling				
VPH 4	EENMALIGE INVESTERINGEN	Tafelkleden Extra bestek TOTAAL € 504,15 (Excl. Servies)	€ 200 € 64,15 € 240 n.n.b.	
	STRUCTURELE KOSTEN	Bloemen	€ 12,50	per 14 dagen
VPH 5	EENMALIGE INVESTERINGEN	Bain marie wagen Transportwagen (koel) TOTAAL € 5420.40	€ 2885 € 750 € 238	met accessoires
		Sauciers RVS (5) Dessertschaal (60) Opscheplepels Servies (40) Bestek (60)	€ 50 € 125 € 226 € 599.40 € 295	Gekozen is voor het goedkopere RVS schalen. Mogelijkheid is ook porselein. Dit oogt wel mooier maar is duurder in gebruik i.v.m. breuk.
	STRUCTURELE KOSTEN	Bloemen Tafelkleden (6st)		geen informatie beschikbaar geen informatie beschikbaar

Werkdocument 11. Taakomschrijving

Taak zorgmanager

- ❖ Vertegenwoordigt de zorg
- ❖ Inventarisatie benodigde materiaal:
- ❖ Tafellakens, servies, bestek en bloemen
- ❖ Afdelingshoofden initiëren en stimuleren tot enthousiasme en attitude verandering

Taak hoofd voeding

- ❖ Mogelijkheden van de keuken vertegenwoordigen
- ❖ Inventarisatie van benodigd materiaal:
- ❖ Bain Marie wagens (=bulk) of portioneren van dekschalen
- ❖ Dekschalen in overleg met de voedingsassistenten. Deze hebben goed overzicht over tafelindelingen ed.
- ❖ Opscheplepels

Taak artsen

- ❖ Controleren van de noodzakelijkheid van voorgeschreven diëten
- ❖ Medische motivatie gezonde voeding
- ❖ Coördinator interdisciplinair overleg
- ❖ Voorlichten van andere disciplines

Taak diëtisten

- ❖ Noodzakelijkheid van diëten
- ❖ Controleren op consistentie van de maaltijd
- ❖ Oplossen van individuele / cliënt gebonden eet- / drinkproblemen
- ❖ Coördinator interdisciplinair overleg
- ❖ Voorlichten van andere disciplines

Taak facilitaire manager

- ❖ Zorgen voor het benodigde materiaal: tafellakens, porselein, bestek, opscheplepels, au-bian-marie wagens en bloemen.
- ❖ Logistiek traject regelen: afwas en vervoer wagens

Taak cliëntenraad

Het proces bewaken vanuit het standpunt van de cliënten. Dit is geen vrijblijvende functie. De cliëntenraad heeft een belangrijke rol in het centraal stellen van de bewoners, de bewonersinformatie verstrekking en bewoners tevredenheid. Zo kan de cliëntenraad het tevredenheidsonderzoek bij de bewoners opzetten. De resultaten van het onderzoek bespreken met het management en de nodige aanpassingen aanvragen en opvolgen.

Taak directie en management

Het project ondersteunen en voorwaarden scheppen door vb. budget voor materiaal aanschaf, extra uren medewerkers, kantoorvoorzieningen, werkbezoeken, ... etc.

Taak cliënten

De cliënt is waar het omdraait, geef deze dan ook een participerende rol in de uitvoering van het project op de afdeling waar hij/zij woont. Bijvoorbeeld: tafelindeling, servieskeuze, tafellakens, tijdstip van de maaltijd, ...)

Werkdocument 12. Voorbeeld van een warme maaltijd schema

TIJD	ACTIE
11.30-12.00	Lunchpauze voedingsassistent
12.00	Lunchpauze eerste groep verzorgenden
12.10	Voedingsassistent of de transportdienst brengt de etenskar mee naar boven Verzorgende deelt medicatie rond Voedingsassistent en Verzorgende: <ul style="list-style-type: none">▪ Tafels afruimen▪ Tafellakens en bloempje op tafels zetten▪ Bestek, borden en glas op tafel zetten
12.20	De schalen worden uit de warm-houd-kar gehaald en de VA verdeelt de schalen over twee karren
12.30	Eerste groep verzorgenden keert terug van lunch.
12.30-13.15	Personeel zet eten op tafel, helpt de cliënten verder en blijft bij hen aan tafel zitten indien hulp nodig is. Wanneer alle cliënten klaar zijn met eten wordt het nagerecht aangeboden. Na het nuttigen van het nagerecht wordt de tafel in zijn geheel afgeruimd door de verzorgende die bij hen aan tafel zit
13.15	Tweede groep verzorgenden gaat lunchen
13.15	Voedingsassistente ruimt verder de huiskamer en keuken op

Werkdocument 13. Vragenlijst voor de bewoners

De vragenlijsten ten behoeve van het interviewen van de bewoners kunnen opgevraagd worden bij de auteur. U kunt uw aanvragen hiervoor richten tot kristel.nijs@wur.nl.

Werkdocument 14. Vragenlijst voor de medewerkers

De vragenlijsten ten behoeve van het interviewen van uw medewerkers kunnen opgevraagd worden bij de auteur. U kunt uw aanvragen hiervoor richten tot kristel.nijs@wur.nl.

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