The Journal of Nutrition, Health & Aging©
Volume 8, Number 4, 2004

NUTRIENT CONTENT OF SERVED FOOD, NUTRIENT INTAKE AND NUTRITIONAL STATUS

NUTRIENT CONTENT OF SERVED FOOD, NUTRIENT INTAKE AND NUTRITIONAL STATUS OF RESIDENTS WITH DEMENTIA IN A FINNISH NURSING HOME

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Abstract: Purpose: The aim of this study was to determine the energy and nutrient content of the served food, the actual energy and nutrient intake and the nutritional status of elderly residents in a nursing home. Methods: The nutritional status of 23 individuals aged 69 to 89 years with dementia were assessed by Mini Nutrition Assessment test (MNA). The nutrient content of the served food was calculated from all meals during a 14-day period. Food consumption was determined by precise weighing method. Results: Of 23 residents, 20 were at risk of malnutrition and three were malnourished according to MNA. The mean energy content of the served food was 1665 kcal (7.4 MJ) per day. The amount of vitamin D in served food was too little and the amounts of vitamin E, folic acid, and fibre were somewhat lower than the recommended level. The amounts of other nutrients were sufficient or substantial. However, the true mean intake of energy in the whole group was only 1205 kcal (5.4 MJ) per day. The mean protein intake was 59 g. Intakes of vitamin D, E, and folic acid were clearly less than recommended whereas intakes of calcium, magnesium and zinc were as recommended. Conclusions: It may be possible to get enough energy and most nutrients from the served food, but many elderly nursing home residents did not eat enough. It may be helpful to individually assess, assist and monitor those residents who eat very little in a variety of ways to promote their quality of life.

Key words: Malnutrition, MNA, dementia, nursing home, energy intake, food.

Introduction

Low body mass index (BMI), unintentional weight loss (1) and nutritional problems are common among nursing home residents (2,3). Low BMI and weight loss are risk factors for mortality in the elderly population (4). Malnutrition is associated with many syndromes and clinical problems like dementia, depression, stroke, impaired physical functioning, falls and traumatic injuries, particularly hip fractures (5,6). In addition, nutrition has a strong influence on the immune system and malnutrition induces lower immune responses thus exposing malnourished frail older people to infections and bed sores (7). On the other hand, it has been shown that administration of nutritional supplements is beneficial for those at risk of malnutrition (8). Addressing nutritional deficiencies has been suggested as a way to reduce infection and to encourage immune responses (9).

Several studies have shown that energy needs decline with advancing age but the need for nutrients is the same or even greater as that of younger people (10). Current American dietary reference intakes (DRI) (11) for energy for people over 70 years are 1564 –2238 kcal/day which replace the Recommended Dietary Allowances (RDA) (12). According to the Finnish National Nutrition Council, the reference value for energy requirement for women over 75 years with low physical activity is 1570-1850 kcal (6.5-7.7 MJ)/day (13) which is close to French recommendations for people over 65 years (1500-2100 kcal/6.3-8.8 MJ/day) (14). The recommendations of the National Nutrition Council are based on the Nordic recommendations (15). (Table 1.)

Table 1

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>1989 RDA (12)</th>
<th>1992 France (14)/Finland (13)</th>
<th>2002 USA DRI (11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years</td>
<td>51+</td>
<td>65+</td>
<td>75+</td>
</tr>
<tr>
<td>Energy, F/M * kcal</td>
<td>1900/2300</td>
<td>1500/2100</td>
<td>1570/2070</td>
</tr>
<tr>
<td>Fat % of 30 energy</td>
<td>30</td>
<td>30-35</td>
<td>30</td>
</tr>
<tr>
<td>Vitamin A, F/M RE, µg</td>
<td>800/1000</td>
<td>800</td>
<td>800/900</td>
</tr>
<tr>
<td>Vitamin D, µg</td>
<td>5</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Vitamin E, F/M mg</td>
<td>8/10</td>
<td>12</td>
<td>8/10</td>
</tr>
<tr>
<td>Thiamin, F/M mg</td>
<td>1.0/1.2</td>
<td>1.3</td>
<td>1.0/1.1</td>
</tr>
<tr>
<td>Riboflavin, F/M mg</td>
<td>1.2/1.4</td>
<td>1.5</td>
<td>1.2/1.3</td>
</tr>
<tr>
<td>Vitamin B12, µg</td>
<td>2.0</td>
<td>3</td>
<td>2.0</td>
</tr>
<tr>
<td>Folic acid, F/M µg</td>
<td>180/200</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Vitamin C, F/M mg</td>
<td>60</td>
<td>80</td>
<td>60</td>
</tr>
<tr>
<td>Sodium mg</td>
<td>&lt;5 g</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calcium mg</td>
<td>800</td>
<td>1200</td>
<td>800</td>
</tr>
<tr>
<td>Zinc F/M mg</td>
<td>12/15</td>
<td>12</td>
<td>7/9</td>
</tr>
<tr>
<td>Selenium, F/M µg</td>
<td>55/75</td>
<td>70</td>
<td>40/50</td>
</tr>
<tr>
<td>Iron mg</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

* F=females, M=males

NUTRIENT CONTENT OF SERVED FOOD, NUTRIENT INTAKE AND NUTRITIONAL STATUS

Dietary reference intakes for elderly people in USA, France and Finland.
People with dementia often suffer from malnutrition (16) but with good nutritional care the nutritional status even among the oldest patients at their final stage of dementia may be improved (17). Over 85% nursing home residents suffer from dementia (18). Since people with dementia often find it difficult to be understood or to communicate it is very important that nurses have enough training about the nutritional needs of demented persons in order to improve quality of life (19).

People over 65 years of age who suffer from malnutrition can be identified by the widely used Mini Nutritional Assessment (MNA) test (20). To maintain a good nutritional status among the residents, the first step is to ensure that the nutritional content of the food served is sufficient. The food should also be palatable and the eating environment and atmosphere pleasant (21).

Thus, there are numerous studies which show that malnutrition and its consequences are common among nursing home residents. However, less is known about the causal process leading to malnutrition. Particularly, there are few studies investigating the actual energy and nutrient intake of nursing home residents with dementia. The aim of this study was to measure and compare the energy and nutrient content of the served food to the recommendations, to assess the energy and nutrient intake and to determine the nutritional status of the elderly demented residents in one nursing home.

Methods

All 23 aged residents with dementia in a nursing home with two wards in Helsinki were assessed during a two-week period. Their permission to participate were obtained from their nearest relatives. The study was approved by the local ethics committee. Cognitive decline and evaluation of the stage of dementia were defined by Mini Mental Status Examination (22). The energy and nutrient content of the served food, the food consumption and intake of nutrients and the nutritional status of each participant was determined according to the following methods.

Energy and nutrient content of the served food

The energy and nutrient content of the served food including all meals, breakfasts, lunches, dinners and snacks, was calculated during a 14-day period. The recipes were calculated just as they were prepared for meals in the food service. The average size of a portion was estimated as the food service just as they were prepared for meals in the food service. The calculations were done by the Nutrica-program version 3.01 developed by the Social Insurance Institution of Finland (23).

The energy and nutrient intake

The food consumption of the residents was determined by the precise weighing method during the same period of time as the nutrient content of menu was determined. For each person all the food was weighed before eating and their leftovers were weighed after eating during three days. The food records were analysed by the Nutrica-program. The recipes of foods were acquired from the food service manager and the nutrient content of bread, for example, was taken from the packing labels. Possible additional snacks eaten by the residents during the study period were investigated by making an inventory of all the food the elderly residents had in their rooms before and after the study days. In addition, relatives were asked whether they had given something to eat when meeting the residents.

Nutritional status

The nutritional status of each resident was assessed by the Mini Nutritional Assessment test (20). The nurses helped answering the questions when needed because the study participants had difficulty in communicating and the nurses had long experience of nursing them. The nurses weighed the residents with the same scales as they usually used once a month. Changes in weight during the last three months were easy to find out because of this regular weighing. Residents’ height was estimated from knee height as recommended for the older people who often have difficulties standing straight (24).

Results

All 23 residents of two wards were assessed in a nursing home. All residents were females with a diagnosis of moderate to severe dementia according to MMSE. The participants were old: the mean age was 82 years (range 69 to 89). Most participants had more than three prescription drugs per day, the median was nine drugs per day.

Food was prepared in the nursing home kitchen situated in the same building as the wards. Meals were delivered in large cooking vessels from the kitchen to the wards. The nurses distributed the meals to the residents and helped them with feeding when needed. The mealtimes were usually: breakfast at 8.30-9.00, lunch at 12.00-12.30, coffee at 14.30 and dinner at 16.30-17.00. Only a few residents received an evening snack, mainly for diabetes or for drugs requiring a concomitant meal. Lunch was the main meal in this nursing home. A typical lunch consisted of potatoes, meat, vegetables, milk, bread and dessert. All the residents ate together around a big table in both wards.

Energy and nutrient content of the served food

If the residents had eaten all the food that was planned, they would have received energy of 1665 kcal (7.4 MJ) per day on average. The proportion of the fat in the served food was 34.7% from total energy, and that of saturated fatty acids 16.3% (Table 2).

The amount of most nutrients in the served food was sufficient or substantial (Figure 1). Only the amount of vitamin D was clearly below that recommended and also the amounts of vitamin E, and folic acid were somewhat lower than recommended.
The amounts of nutrients in the served food and the intake of nutrients of the group of elderly residents as percentages of the recommendations.

Intake of energy and nutrients

The average intake of energy in the whole group was only 1205 kcal (5.4 MJ) per day (Table 2). The minimum was 912 kcal (4.1 MJ) and maximum 1683 kcal (7.5 MJ), while the reference value for energy requirement with low physical activity according to National Nutrition Council (13) in this age for women is 1570-1850 kcal (6.5-7.7 MJ)/day. The average of protein intake was 59 g (45.4 g – 80.2 g).

Table 2

<table>
<thead>
<tr>
<th>Test result, points</th>
<th>Number of subjects (total n=23)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at risk of malnutrition</td>
<td>≥24</td>
</tr>
<tr>
<td>At risk of malnutrition</td>
<td>17-23,5</td>
</tr>
<tr>
<td>Malnourished</td>
<td>&lt;17</td>
</tr>
</tbody>
</table>

Nutritional status

The residents’ average height was 159 cm (range 146 cm – 170 cm) and weight 63 kg (44 kg – 90 kg). Less than half (44%) of the elderly had the optimal BMI (23 or more) whereas 21 % had a BMI lower than 21. Over half (57%) of the elderly residents studied had not lost weight during the last three months and for the rest of them the weight loss had been between 1 and 3 kg. All the elderly residents were able to get out of bed but they did not go outdoors.

All of those studied were able to eat independently. According to the MNA-questionnaire most (87 %) of the residents ate without any problems and the rest needed some help in eating. However, the nurses had observed that half of the residents had difficulties in eating caused by, for example, dentures, tumour in the mouth, difficulties in swallowing, hemiplegia, difficulties in perceiving or coordination, lack of comprehension or concentration or compulsive behaviour. A few of the residents did not understand how to use cutlery anymore or had stopped eating and needed some encouragement in order to continue eating.

Only one of these elderly ate so little that she did not eat three full meals daily. All residents ate dairy products daily and half of them ate at least two servings of fruit and vegetables per day. Most of the residents were at risk of malnutrition on the basis of the MNA-test (Table 3). Three residents were estimated as malnourished.

Discussion

All residents with dementia in this nursing home were either malnourished or at risk of malnutrition according to MNA. The energy content and the nutritional value of the food served to them were adequate but the residents ate considerably less than was planned. Thus, it could have been possible to get enough energy and most nutrients from the served food.

The intake of energy was only about 1200 kcal per day, whilst the reference value for energy requirement with low physical activity according to National Nutrition Council in this age for women is about 30 to 50% higher (13). The proportion of protein was high, on average nearly 20 E%, and also the absolute protein intake was adequate compared to the recommendations (Table 1). The proportion of total fat was
lower than 30 E%, which could have been higher especially for those who ate very little.

The proportion of fat from the total energy was close to the recommended level (13). The main source of saturated fatty acids was the butter-oil mixture used on bread and the amount of that could have been less. However, the residents in this study were very old and have a life expectancy of only a few years. Thus, it is not ethical to make big changes to their habitual diets. Instead, they should be offered the food they like and are used to. Many of the elderly residents ate very little, and the energy density of food could be added by the fat. For example, oils and soft vegetable margarines should be used when possible. Especially, residents should be offered their preferences and favourite meals.

The low intake of energy may be due to several reasons. The nurses distributed the meals and without nutritional education their idea of the proper amount of food may be wrong and they gave too little food to residents (19). Also the nurses’ idea of proper BMI for older adults is often the same as it is for young and middle-age persons (25), and therefore nurses may control the possible and sometimes even desirable weight gain (26) too strictly. In feedback discussions with the staff it was surprising for them how little energy the residents actually received in their daily meals. Older people who have higher BMI values have a lower mortality risk than do younger and middle-aged persons (26). The optimal range of BMI, especially for elderly people living in institutions is 24 to 29, instead of 20 to 25 (25). Unintentional loss of weight is common, especially in nursing home residents who are depressed or who have dementia (27).

On the other hand, the residents lack appetite due to multiple medications and little physical activity. All the meals were served over a period of eight hours. Therefore there may not have been enough time to develop a good appetite for each meal. The time between the last meal in the evening and the breakfast was too long. The intake of energy could have been increased by offering a suitable snack when having coffee in the afternoon. In addition, it could have been even more important to offer an evening snack to all residents. There is also evidence that snacks in the form of finger foods should be offered when possible. Especially, residents should be offered their preferences and favourite meals.

Despite the low intake of energy, intakes of nutrients were adequate or substantial except for vitamin D, E and folic acid the intakes of which were less than recommended. Thus, possible inadequacies were not only caused by the served food and its energy or nutrient density but also derive from the problems in eating, eating behaviour, appetite and the time spent eating (21). These problems may be helped by organizing mealtimes to cover a longer period of day, by better cooperation between the nurses and the kitchen staff and preparing specific energy and nutrient dense foods for those elderly residents who need it.

According to the MNA most of residents in this study (87%) were at risk of malnutrition and 13% were malnourished. The MNA is a well validated and sensitive scale for nutritional status of aged individuals (6). It has been used among nursing home residents with dementia in numerous studies (30). There are other scales developed particularly for nursing home residents (31).

The most important underlying factors of this finding were living in an institution, dementia, taking many medications and the inability to go out but people with dementia can be helped with good nutritional care even at the final stage of dementia (17). Many factors can cause malnutrition (6) and many of those problems cannot be solved easily. Malnutrition among nursing home residents is associated with concomitant diseases, impaired functioning, mouth and swallowing problems (32). Aversive feeding behaviour (33) and also metabolic abnormalities (34) have been suggested to be involved with the process of loosing weight. It is important to identify these residents who are malnourished or at risk of malnutrition in a nursing home, and then provide adequate, immediate and individually tailored nutritional support to prevent further deterioration if possible.

The limitation of our study is the small number of assessed subjects, only 23 residents. However, assessing the whole process from food preparation to detailed nutrient intake until nutritional status of residents takes time and resources and is work-force intensive, and it would be difficult to perform on a large scale. To our knowledge this is the first study where the whole process has been described and compared in detail.

Maintaining good nutritional status among the elderly residents is the result of the team work among the whole staff in institutions and nursing homes. It is the responsibility of the food service staff that food contains enough energy and nutrients and the dishes are palatable and attractive for the residents. Nurses are responsible for helping the residents at mealtimes and measuring the nutritional status of the elderly residents. More co-operation is needed to identify individual nutritional needs and to respond to them in a way that enhances their quality of life.

Acknowledgments: This study is part of a larger study which The Central Union for the Welfare of the Aged in Finland has organized in order to emphasize the nutritional aspects of good care of the elderly on the levels of research, information and practice. Great thanks to the personnel of the nursing home for their co-operation during the study.

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