Malnutrition in Old Age in Dementia Causes, Assessment, and Treatment

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Malnutrition in Dementia and its Importance

In 2010, 35.6 million older people were reported with dementia worldwide. This is expected to double every 20 years and rise to over 60 million in 2030, and 100 million in 2050 [1]. Although the exact number of patients with dementia is currently unknown in Turkey, studies from different states reported similar prevalences of 20-30% [2-6].

Structural and physiologic changes in the gastrointestinal system lead to malnutrition (MN) with aging [7]. A patient with dementia is at risk for MN. Dementia is a progressive terminal disease that results in cognitive decline, which renders patients unable to maintain their own activities of daily living [8]. The rate of decline is different for each patient, although a number of factors can increase the likelihood of an accelerated decline, such as MN [1]. Ulger et al. observed risk of MN with a prevalence of 37.3% in older people with dementia [9]. MN results in a decline in muscle function, bone mass, immune functioning, wound healing, and cognitive functioning, with an increase in hospital admission, readmissions, and mortality [10, 11]. There is positive correlation between weight loss, MN, and progression of dementia [12-14]. Increased consumption of foods with carbohydrates rather than loss of appetite and weight may be seen in frontotemporal dementia subtype. Excessive weight gain and poor metabolic status may also arise [15].

Recognition of MN, and knowing the causes and treatment of MN have great importance in older people with dementia.

Possible Causes of Malnutrition in Dementia

Contributing elements of weight loss in patients with dementia can be divided into primary and secondary factors (Table 1) [16-20,24]. Primary factors are disease-related factors, secondary factors are general factors that may contribute to weight loss, such as adverse effects of medication and comorbidities.

Primary factors are the effect of dementia on brain structures that control appetite and energy/need balance such as the mesial-temporal cortex, hypothalamus, cingulate gyrus; depression; changes in taste; impairment in executive functions; development of attention deficits; dyspraxia; agnosia; behavioral problems; and reduction of awareness in eating and hunger. Additionally oropharyngeal dysphagia, aspiration, and cognitive deficits in eating awareness are seen in later stages in patients with dementia.

Secondary factors are drug adverse effects, social factors, comorbidities, and caregiver burden. Cholinesterase inhibitors may contribute to weight loss due to gastrointestinal adverse effects such as nausea, vomiting, and diarrhea [17, 21]. Caregiver burden is also an independent risk factor for weight loss and nutritional deficiency in patients with dementia [16, 22].

Evaluation of Malnutrition

Nutritional status of patients with dementia should be assessed during diagnosis and follow-up (Table 2) [23,24]. Weight measurement and mini nutritional assessment (MNA) should be performed at the time of diagnosis [25, 26]. MNA is recommended for use as a screening tool to detect the risk of MN and MN in older people. Calculation of daily protein and calorie consumption and evaluation of anthropometric measurements, nutritional markers, and bioimpedance assessment are recommended for patients who underwent weight measurement and MNA. Ideal body mass index (BMI) values are different in older people; the optimal BMI is 24-29 kg/m² [27-29].

The MNA should be completed with family and/or caregivers for patients with dementia. Otherwise, misleading results may be expressed due to the patients’ inability to express themselves fully and accurately. In follow-up, weight measurements are recommended at least monthly. If ≥5% weight loss occurs in 3-6 months or malnutrition is determined in MNA, diet modification with appropriate protein and calorie support should be recommended, and oral nutritional supplements (ONS) should be started [23].

It should be noted that causes of malnutrition are multifactorial and possible factors should be determined, such as medications, social, and environmental factors. It was shown that community-dwelling patients with Alzheimer’s disease (AD) without an informal caregiver or partner had a lower average weight compared with patients with an informal caregiver or partner [30]. There is an independent association between decline in activities of daily living and nutritional status of patients with dementia. Physicians...
should be aware of the need for nursing home and hospices in patients with dementia without a specific informal caregiver or partner assistance.

Treatment of Dementia Patients with Nutritional Deficiency

Is there an indication for enteral nutrition in dementia?

The European Society for Clinical Nutrition and Metabolism (ESPEN) recommends the initiation of enteral nutritional therapy in older patients with multimorbidities and frailty in case of risk of MN [31]. Malnutrition is a common problem in patients with dementia and ONS or tube feeding (TF) may improve nutritional status. ONS, and sometimes TF, ensures adequate energy and nutritional data have been recommended in patients with mild and moderate dementia (Level C recommendation). In patients with terminal-stage dementia, tube feeding is not recommended (C). In these cases, the decision should be taken individually for each patient.

A number of reviews are available about nutritional support, weight, survival, and functionality in patients with dementia and different results have been shown [32-35]. ONS shows a positive effect on increase in body weight [36, 37]; however, conflicting results have been observed with TF as no change or increase in body weight [31, 38]. No effect was observed in functionality in the OND [36, 37] and TF group [39, 40]; however, it was observed that regulation of eating and nutritional habits had positive impacts on functionality [41, 42]. Although no positive effect on survival was observed in several studies with TF [43-45], Rudberg et al. reported that [46] older people with cognitive deficiency with feeding tubes were less likely to die than comparable residents without feeding tubes ($P < .001$) according to 30th day and 1st year mortality rates. Further lower mortality has been shown in patients with dementia who were feeding with percutaneous endoscopic gastrostomy (PEG) in a few nursing home studies [47, 48]. In contrast, in a retrospective study that compared mortality rates in different diagnostic groups who underwent PEG, the results of the dementia group were found worse [49].

As a result, prognosis shows significant differences from person to person in patients with dementia who receive TF. Each success of nutritional therapy and prognosis is significantly associated with the severity of existing disease, the type and severity of comorbidities, and the patients’ overall health status. Therefore, providing adequate nutrition is recommended in patients with mild and moderate stages of dementia, especially for maintaining current overall health, and prevention of nutritional deficiencies that may develop later (C).

TF can be useful in some patients with dementia. One should be cautious when deciding the following:

- The patient’s previous demand on TF
- The severity of disease

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<th>Primary Factors</th>
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<td>Cognitive factors</td>
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<td>Behavioral disturbances</td>
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<td>Medial temporal lobe atrophy</td>
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<td>Biologic disturbances*</td>
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Forgetting to eat, refusal to eat, increased energy expenditure, inability to preparing meals, loss of appetite

Imbalance between energy intake and energy expenditure

Weight loss

Table 1: Possible causes of weight loss in dementia [16-20,24]
• Evaluation of prognosis and life expectancy for each patient specifically
• Comparison of proposed quality of life with tube or tubeless nutrition
• Evaluation of possible complications and damage due to TF
• Mobility of patients

TF is not recommended in patients with terminal-stage dementia (irreversible, immobile, fully dependent, lack of financial resources)(C). Oral, manual feeding can be performed [50]. There is insufficient evidence as to whether TF prevents aspiration pneumonia in people with dysphagia. In patients with dysphagia, oral nutrition has a risk of aspiration, and TF may also result in increased reflux and aspiration of gastric contents. Undesirable agitation and other complications may also occur [51-54].

For these reasons, the decision for tube or tubeless feeding should always be obtained individually for each patient. The decision should be made together with the patient's family, caregivers, therapists, physicians who provide follow-up care thereafter, and legal advice should be obtained if necessary.

The First Steps of Malnutrition Treatment
The treatment of patients with dementia who have MN has many steps, similar to its causes (Table 3) [55]. These include environmental modifications, overcoming eating difficulties, nutritional supplements, and education of family and caregiver.

Environmental Modifications
Environmental modifications are needed to provide accurate nutrition in patients with dementia. Structural features, ambience, psychologic, and sociologic circumstances of the environment have effects on an older person's nutrition. Memory and recognition abilities decrease in the process of time, which becomes especially obvious in the later stages of the disease. It would help patients to remember that they need to eat by being brought to a dining room...
instead of eating in the chair or bed in which the patient spends all day. If there is no separate dining room, items such as service tray and cutlery also help patients to remember eating [56]. The use of a tablecloth and dishes, which make a contrast with the meal and the cutlery, especially with specific colours (some reports indicated that blue and red were ideal colours) can increase oral intake [57]. In addition, it is important that the room is bright enough [58], but excessive light should be avoided. Stimulants that can decrease interest in the meal also should be kept away. Crowds, loud noises, and mess in the room should be avoided, and a quiet ambiance that can relieve the patient should be provided. Soft music may be suitable if necessary. It is recommended to have meals with family members or the other residents if in a nursing home, because it helps to remember eating and provides ideal communication [59, 60].

### Fighting with Eating Difficulties

There are many eating difficulties associated with dementia. Besides dementia itself, impairment in physical activity, constipation, depression, pain, tiredness, and drug effects may also cause eating difficulties. Therefore, mealtimes should be long and modifiable as much as possible. Meals with plenty of energy, diets modified according to patient's requirements, additional snacks, providing foods that can be eaten by hand, small portions and regular meals, giving one food as a meal and additional appetizers may be suitable. Constipation is a frequent problem. Precautions such as adequate fluid intake, encouragement for movement, increasing the fiber content of foods (e.g. salad and apricot-plum compote), and addition of pure olive oil to meals may be taken. Patients should have a dental examination by a dentist. If patients do not want to eat a meal, they should never be forced to eat. Patient-preferred foods should have priority (old habits). Physical activity may be helpful to increase appetite by increasing the consumption of energy. Aspiration is also an important reason of eating difficulty. This occurs more commonly while drinking fluid, soup or eating meals with fluid sauce. Jelly and pureed foods are better tolerated. Therefore, thickeners may be suitable to add to meals [61].

### Nutritional Supplements

Macronutrients are proteins, carbohydrates, and lipids that are needed in a large part of a diet. Protein intake has special importance in older people who nourish poorly. Protein support helps weight gain and decreases mortality [62]. It has been shown that the oral nutritional support is helpful for gaining weight but has no effect on cognition [63].

A patient's requirement of energy, protein, and fiber should be calculated before starting treatment.

After the basal metabolic rate BMR was calculated as 25-35 kcal/day, the BMR was multiplied by 'activity factor' (AF), which was determined according to the patient's mobility. Activity factor is 1.1 for a patient who is immobile in bed, 1.2 for a patient who has the ability to move but only in bed, and 1.3 for a mobile patient. Coefficients variable from 1.1-2 should be added in the presence of fever (thermal factor=TF) or other stress factors (SF) such as

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**Table 3**: Evidence-based recommendations for increasing nutritional intake in older people with dementia
fracture or trauma.

Energy requirement can be calculated as $= \text{BMR} \times \text{AF} \times \text{SF} \times \text{TF}$.

Protein content should be calculated as $>1g/kg$ (1.2-1.4 g/kg) for older people.

Fiber requirement is about 21 g/day in women and 30 g/day in men.

Roaming without purpose increases the requirement of energy in patients with dementia. Therefore, it is especially important to consider the activity factor in these patients.

On the other hand, micronutrients are elements that are required in minute amounts in the diet. Studies have various results regarding micronutrient support in patients with dementia [64-66]. There are no definite data concerning vitamin B12, B6, C, E, folic acid, and alpha lipoic acid to provide cognitive recovery at any stage of dementia. It is recommended that the decision of micronutrient support should be taken specifically for each patient [60]. However, vitamin D should be replaced in patients with dementia, just like in all older people.

**Education and Recommendations**

The education of caregivers (formal and informal caregivers) shows positive effects in patients' oral intake [67]. However, studies in this field are limited [68].

Booklets have been prepared by the Turkish Alzheimer Association to inform patients and their relatives, which are freely accessible on the internet.

(http://www.alzheimerdernegi.org.tr/bizim-hizmetlerimiz/bakim-onerileri/beslenme/)

Patient's relatives should be informed about changes of diet, nutrition monitoring, protein-rich diets, and determining eating difficulties. For example:

1. They should pay attention to fluid intake. Fluids such as tea or coffee should be minimized, at least they should not be served at night. Overconsumption of these fluids may cause difficulty in falling asleep, agitation, an waking during the night to urinate.

2. The number of taste buds on the tongue diminishes with aging. In parallel, the sense of taste, mostly the taste of salt, diminishes too. Therefore, elderly patients tend to consume more salt to be able to taste foods as they used to before. Overconsumption of salt may cause hypertension, edema, and worsening of heart failure. Older people should be closely observed and a sodium-restricted diet should be provided if necessary.

3. Some medications used for dementia treatment may cause nausea, vomiting and lack of appetite. If these symptoms present, a doctor should be informed.

4. The patient's ability of putting in and taking out their dentures and using knives and forks may decrease. Deep, cornered plates, and ergonomically designed knives and forks may be useful. Placing a wet cloth under plates can prevent them from slipping. Glasses with handles should be preferred. Glasses with lids may prevent the liquid from spilling.

5. If patient has difficulty in swallowing, semi-liquid food (e.g. puree) may be preferred instead of pure liquids. Thickeners may be used. Cough may occur because foods pass the trachea while swallowing. To prevent this, patient's should eat while sitting, but if this situation continues oral nutrition should not be insisted upon. If nutrition is insufficient in spite of proper support, the doctor should be informed and a nutritional support should be planned.

6. In addition, moral support for the family/caregiver should not be forgotten to preclude caregiver burden.

**Conclusion**

The incidence of dementia increases exponentially with increasing age, based on the available estimates for the global incidence of dementia. Therefore, it is becoming more important to realize, provide, and treat nutrition problems in patients with dementia. It should not be forgotten that each new patient who is diagnosed as having dementia is a potential malnutrition patient and attention should be paid to evaluating the patient's nutritional status by measuring body weight and calculating MNA score, beginning from the first examination. It is important that nutrition has enough calories and to be adequately protein rich. Nutritional support is not the only consideration, however, environmental modifications, overcoming eating difficulties, and education of caregivers have also gained importance. Cooperation of the patient, caregivers, and health workers is very important for providing ideal nutrition to patients with dementia.

**References**


