Nutrition in Older Adults

Module 36.2

Nutritional Screening, Assessment and Diagnosis
Dietary Advice and Oral Nutritional Supplements in Older Adults

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Learning objectives
- To know the recommended strategies for screening, assessing and diagnosis of undernutrition in older persons;
- To know which strategies should be applied to feed malnourished older persons.

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Key Messages
- Nutritional screening and assessment should not only target food intake and nutritional requirements, but also address problems in the medical, functional, cognitive and social domains;
- Screening and assessment tools are helpful tools to identify older people at risk of malnutrition, but the perfect tool does not exist;
- The diagnosis of malnutrition according to ESPEN requires either a low BMI, or a combination of weight loss with either reduced BMI or low fat free mass;
- Protein requirements of older people are thought to be higher than 0.8 g/kg/day;
- Enriched food is the first choice to improve food intake;
• Oral nutritional supplements should be considered if enriching food does not lead to stabilising or improving the nutritional status.
1. Introduction

Although people live longer (1), they also increasingly face various age-related chronic health problems, cognitive changes, side effects of medication, changes in dentition or the ability to swallow, functional disabilities, social isolation, depressive symptoms and chronic diseases like diabetes, dementia, heart disease etc. (2, 3). These factors are all known to negatively impact on individuals’ food intake. It has been repeatedly shown that the prevalence of malnutrition is high among older persons.

Malnutrition prevalence rates are the highest in hospitalized and in nursing home patients (affecting approximately 1 in every 4 to 5 patients (4)), however the absolute highest number of malnourished older patients lives at home. In the community prevalence rates of malnutrition are around 5% in ‘younger old’ (65—70 years), 20% in ‘older old’ (≥ 85 years) and 30% in those in need of home care (5).

With the focus of care shifting from institutions to the home situation, practical measures to screen, diagnose and treat malnourished older persons should therefore be available for all health care settings.

2. Nutritional Status

The nutritional status is a result of nutritional intake, nutritional requirements and influencing factors from the medical, functional, cognitive and social domains (6, 7). In older persons, multi-morbidity is thought to be the most important cause of malnutrition. Imbalance can occur in situations where there is not enough food available (e.g. poverty, self neglect, problems with shopping or cooking), or when the quality or presentation of food is insufficient. On the other hand an imbalance can arise when, despite adequate availability, nutritional needs are increased or when the intake of food is insufficient. Malnutrition in older persons is almost always a combination of a poor intake on the one hand, and multiple other problems (either in the somatic, functional, cognitive, or social domain) on the other hand. Because of this multifactorial background of malnutrition in older persons, the assessment of the nutritional status should address all four domains influencing nutritional status (Table 1):

Table 1
Factors influencing nutritional status

<table>
<thead>
<tr>
<th>Somatic/medical factors</th>
<th>Functional factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, sex</td>
<td>Hand grip strength</td>
</tr>
<tr>
<td>Medical diagnosis, disease stage / characteristics</td>
<td>Walking speed</td>
</tr>
<tr>
<td>Hospital admission / surgery / treatment</td>
<td>Activities</td>
</tr>
<tr>
<td>Laboratory results</td>
<td>Exercise / sports</td>
</tr>
<tr>
<td>Gastrointestinal complications</td>
<td>(I)ADL dependency</td>
</tr>
<tr>
<td>Appetite</td>
<td></td>
</tr>
<tr>
<td>Difficulties in chewing and swallowing</td>
<td></td>
</tr>
<tr>
<td>Anthropometry (body weight and height, weight loss)</td>
<td></td>
</tr>
</tbody>
</table>
As a starting point, it is of course essential to obtain an accurate medical history from the patient. With increasing age the number of chronic and acute diseases is increasing as well. The more underlying diseases, the more likely a patient is to be malnourished. Disease may cause an imbalance between requirements and intake. There is no convincing evidence that disease increases the long-term nutritional requirements per se, however disease may affect intake. Appetite is already decreased with higher age due to altered hormonal and neurotransmitter regulation of food intake, so called ‘anorexia of aging’. Thus, feelings of hunger and satiety may be disrupted. Diseases, such as COPD, cancer or heart failure, may affect appetite even further. But also psychological and social factors such as loss of a partner, loneliness, depression or anxiety may influence appetite. In addition, a high level of care dependency, polypharmacy, poor dentition, chewing and swallowing problems, neurological diseases, impaired smell or taste (due to age, disease or medication use) may all affect nutritional intake. Despite its high prevalence, malnutrition in older persons is still inadequately recognized and treated. Screening and assessment tools have been developed to facilitate early recognition of malnutrition in older persons. Beyond screening there is also a need to define universal criteria for the diagnosis of malnutrition. So far there has been a lack of such universally accepted criteria. The screening tools usually not only define those at risk, but also give criteria for malnutrition. Since these tool-specific criteria differ, the reported prevalence of “true” malnutrition...
varies a lot depending on which tool that is used. Therefore ESPEN has provided a format for the diagnosis of malnutrition. It is important to emphasize that screening is always the first step in the diagnostic procedure.

3. Screening and Assessment of Nutritional Status

When obtaining a picture of a patient’s nutritional status, weight, height, involuntary weight loss, appetite and intake seem to be essential components. Cut-off points for weight and derived BMI are not agreed on in older persons. Older persons have a decreased lean mass and an increased fat mass compared to younger ones. Weight measurements may be influenced by the presence of oedema, ascites, pleural effusion and loss of body parts. A repeated measurement over time is much more informative than a single measurement. Height measurement may be constrained by standing problems or e.g. spinal deformities. Although the official WHO BMI cut-off point for malnutrition is still 18.5 kg/m², experts suggest that higher cut-off points should be applied for the older population. A recent systematic review showed that the optimal BMI range for the lowest mortality in older adults was overweight (25 kg/m² ≤ BMI < 30 kg/m²) or mildly obese (30 kg/m² ≤ BMI < 35 kg/m²) (10).

Arm circumference, calf circumference have been suggested as substitutes, or even better alternatives for BMI (11, 12).

Objectifying intake or appetite, in relation to nutritional needs, may be a challenge. First it is helpful to question the patients about restrictive diets and consumption of alcohol or tobacco. Well-recognized methods to measure intake are food-diaries or a 24-hour recall. However these methods depend strongly upon the cooperation of the patient and often seem inappropriate when patients suffer from cognitive impairment. Plate rating may be a quick alternative and gives a rough idea of a patient’s intake. In the nutritionDay survey, the amount eaten during meals was indicative of a poor outcome (13).

![Easy meal registration](image)

**Fig. 1** Example of plate registration

Nutritional intake should always be compared to nutritional requirements. Of all available equations to predict energy expenditure in older persons, not a single one estimates the actual requirements better than in 65% of cases (14). A pragmatic solution could be to advise at least 1500 kcal per day for older women and at least 1700 kcal per day for...
older men and to monitor their weight over time (14). For malnourished subjects a diet is likely to be most effective if it provides at least 400 extra kcals per day compared to the usual diet (15).

To diagnose malnutrition in the older persons, the following cut-off points are frequently used (expert opinion):

<table>
<thead>
<tr>
<th>Involuntary weight loss:</th>
<th>&gt; 5% in the last 3 months or &gt; 10% indefinite of time</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>&lt;22 kg/m²</td>
</tr>
<tr>
<td>Arm circumference</td>
<td>&lt;26 cm</td>
</tr>
<tr>
<td>Calf circumference</td>
<td>&lt;31 cm</td>
</tr>
</tbody>
</table>

### 4. Screening and Assessment Tools

During the past decades, numerous screening and assessment tools have been developed with the aim of quickly identifying patients at risk of malnutrition, for more in-depth nutritional assessment, or for identifying patients at risk of developing complications or even mortality. A reasonable number of these tools has been validated or even specifically developed for the older population. According to the ESPEN guidelines (16) an ideal screening tool should offer high predictive validity, completeness of relevant information, low inter-observer variability, high practicability, and no redundancy. In addition, an intervention plan should be based on the results of the screening tool. It has to be admitted that such an ideal screening tool is not available for older persons.

Any screening or assessment tool should be tested for validity, or the extent to which a tool measures what it is intended to measure. Cross-validation in a population different to that from which it was assessed is necessary to be able to pass judgement over the validity of a tool. Three systematic reviews have done so for the hospitalized, nursing home and community populations respectively.

The three tools recommended by ESPEN are MUST (Malnutrition Universal Screening Tool) (17), NRS-2002 (Nutrition Risk Screening 2002) (18), MNA (Mini Nutritional Assessment) (19) and the short form of the MNA (MNA-SF) (20). Both MUST and NRS-2002 were originally designed for all patients in all settings, while MNA and its short form were designed for older people specifically. Two recent reviews have examined the validity of these three tools, as well as many other tools, for screening and assessing malnutrition in the hospital setting and in the nursing home setting (21, 22). For hospitalized patients the criterion or construct validity (i.e. how well does a tool identify a malnourished patient) of MUST and NRS-2002 to identify older patients at nutritional risk was not convincing (22). The MNA has only infrequently been revalidated for older hospitalized patients. The ability of all three tools (MUST, NRS-2002 and MNA(-SF)) to predict outcome was insufficient for older persons (22). Perhaps age per se is a better predictor of outcome than any of the screening tools (23).

In the nursing home setting the MNA and its short form have been revalidated in many more studies and both the criterion validity and the predictive validity (for complications, and mortality) were found to be fair (21). The short form of the MNA performed well
compared to the full MNA, but that is not surprising as the first 7 questions of both tools are identical.

Among other tools, developed and validated specifically for older persons are the Geriatric Nutritional Risk Index GNRI (24), the Chinese Nutrition Screening Tool CNS (25), the (Dutch) Short Nutritional Assessment Questionnaire for Residential Care SNAQ-RC (26), the Minimal Data Set MDS (27), the (American) Simple Nutritional Appetite Questionnaire SNAQ (28), Nutrition Risk Index NRI (29), Nutritional Form For the Elderly (NUFFE) (30), and the Simple Screening Tools #1 and #2 (31). Although most of these tools have been infrequently re-validated, most of them are neither inferior nor superior to the ones that ESPEN recommends.

Given the fact that older persons are often complex persons, the ideal tool for older patients is not yet available and maybe never will become available. Such a tool should perhaps contain more items referring to the multifactorial background in this specific population (21). However, none of the other tools studied in both reviews showed overall good or excellent validity, therefore it is unlikely that the ideal tool will ever be developed.

The authors of the systematic reviews advise never relying completely on a tool to screen or assess a patient’s nutritional status. Clinical judgement should always remain to play a major role. However, for reasons of standardisation and practicability, objective (instead of subjective) screening and assessment tools still remain very helpful tools as a first step towards identification of malnutrition in older persons.

Whilst it has been widely accepted that nutritional screening is useful in institutions, the importance of screening in the community has been much less recognized. Most of the tools applied in community setting have undergone even less extensive testing to demonstrate their validity than the tools applied in hospital and care homes. A recent systematic review carefully recommends MNA-SF for screening in the community, although further studies are required (32), Also MUST (17) and SCREEN II (33) have evidence to support their use. Recently developed tools, such as the Short Nutritional Assessment Questionnaire for people aged 65+ (12) have not yet been systematically reviewed.

5. MNA and MNA-SF

The MNA (19) and its short form (20) are the tools most studied and appear to be the most valid tools for screening of malnutrition in the older person in all health care settings. Bearing in mind that no tool performs perfectly, ESPEN recommends the MNA-SF for screening and assessment of older persons. The MNA-SF has recently been revised whereby BMI was replaced by calf circumference (34).

The full MNA consists of 18 questions covering 4 domains: anthropometric assessment; general assessment; dietary assessment and subjective assessment. The questionnaire scores range from 0 to a maximum score of 30. A score of ≥ 24 indicates an adequate nutritional status. A score between 17 and 23.5 indicates risk of malnutrition, whereas a score of <17 indicates malnutrition.

The MNA-SF is derived from the original MNA and includes only 6 items. The MNA-SF has been designed especially for easy and quick use in clinical practice. If the score amounts to 11 points or less the patients classifies as at risk of malnutrition and the full MNA has to be done. Initial training by someone who is experienced with the tools is advisable. The full version of the MNA takes approximately 10-15 minutes to complete. If a patient
is assessed by a Comprehensive Geriatric Assessment (CGA), the full MNA takes less time as most questions of the MNA are part of the CGA.

Table 2
Revised short form of the Mini Nutritional Assessment

<table>
<thead>
<tr>
<th>Question</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Has food intake declined over the past 3 months, due to loss of appetite, digestive problems, chewing or swallowing difficulties?</td>
<td>severe loss of appetite</td>
<td>moderate loss of appetite</td>
<td>no loss of appetite</td>
<td>n/a</td>
</tr>
<tr>
<td>B. Weight loss during last months?</td>
<td>weight loss greater than 3 kg</td>
<td>does not know</td>
<td>weight loss between 1 and 3 kg</td>
<td>no weight loss</td>
</tr>
<tr>
<td>C. Mobility</td>
<td>bed – or chair-bound</td>
<td>able to get out of bed / chair bus does not go out</td>
<td>goes out</td>
<td>n/a</td>
</tr>
<tr>
<td>D. Has suffered psychological distress or acute disease in the past 3 months?</td>
<td>yes</td>
<td>no</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>E. Neuropsychological problems?</td>
<td>severe dementia or depression</td>
<td>mild dementia</td>
<td>no psychological problems</td>
<td>n/a</td>
</tr>
<tr>
<td>F1. BMI</td>
<td>BMI less than 19</td>
<td>BMI 19 to less than 21</td>
<td>BMI 21 to less than 23</td>
<td>BMI 23 or greater</td>
</tr>
<tr>
<td>IF BMI IS NOT AVAILABLE, REPLACE QUESTION F1 WITH QUESTION F2. DO NOT ANSWER QUESTION F2 IS QUESTION F1 IS ALREADY COMPLETED</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F2. Calf circumference</td>
<td>CC less than 31</td>
<td>CC 31 or greater</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Screening score (max 14 points)
6. ESPEN Consensus Diagnostic Criteria for Malnutrition

In a Delphi process an expert group assigned by ESPEN has given consensus based recommendations for the diagnosis of malnutrition that should be applied independent of clinical setting and aetiology of the condition (35). The major reason for this initiative has been to create a universal definition of malnutrition, in order to establish clear rules and to make it possible to compare prevalence figures between settings and studies. The first step in the diagnostic procedure is to perform a screening by a validated screening tool in order to identify subjects at risk for malnutrition. These subjects need to be assessed and treated accordingly.

Next the subject that has been identified as being at risk of malnutrition should be assessed according to the decided malnutrition criteria (see Fact box). There are two options for the diagnosis of malnutrition. Option one requires body mass index (BMI, kg/m²) <18.5 to define malnutrition. This criterion is in accordance with the traditional definition of underweight as recommended by WHO. Option two requires the combined finding of involuntary weight loss (mandatory) and at least one of either reduced BMI or a low fat free mass index (FFMI). Weight loss could be either >10% of habitual weight indefinite of time, or >5% over 3 months. Reduced BMI is <20 or <22 kg/m² in subjects younger and older than 70 years, respectively. Low FFMI is <15 and <17 kg/m² in females and males, respectively.

Fact box: Two alternative ways to diagnose malnutrition

Alternative 1:
- BMI <18.5 kg/m²

Alternative 2:
- Weight loss (involuntary) >10% indefinite of time, or >5% over the last 3 months combined with either
- BMI <20 kg/m² if <70 years of age, or <22 kg/m² if ≥70 years of age or
- FFMI <15 and 17 kg/m² in women and men, respectively.

7. Dietary Requirements

Once a patient is recognized at risk of malnutrition or malnourished, nutritional intervention should be initiated, aimed at stabilising or improving the nutritional status,
herewith maintaining or improving independence and functionality, and preventing complications or (re-)hospitalisation.
In this chapter we will shortly address macronutrients and vitamin D.

8. Energy
Total energy expenditure (TEE) is a result of resting energy expenditure (REE) plus energy expenditure from activity and disease. As described previously, equations to predict REE provide only rough estimates of actual energy expenditure, with deviations from the actual expenditure between 200 and 400 kcals per day (14). However, they do provide a good starting point for a nutritional intervention, and nutritional goals may be adapted to desired changes in weight. One may also argue that at least 1500 kcal/day should be provided to malnourished older women, and 1700 kcal/day to malnourished older men.
Moreover, Milne and co-workers have shown in their review that an additional 400 kcals/day, on top of the usual diet, are required for nutritional interventions to be effective (15).

9. Protein
For older patients to be in nitrogen balance, the protein intake is most likely higher than the 0.8 g/kg/day suggested by WHO. The need for more dietary protein is in part because of a declining anabolic response to protein intake in older people; more protein is also needed to offset inflammatory and catabolic conditions associated with chronic and acute diseases that occur commonly with aging (36).
Recently, two consensus groups came up with the new recommendations (see Fig. 2 and Tables 3A and 3B below).
In general Deutz and colleagues recommend a dietary protein intake of at least 1.0 g protein/kg/day (37).

![Dietary protein intake](image)

**Fig. 2 Recommendations by Deutz et al (37) for protein intake of older adults**

In a consensus statement by the PROT-AGE group, these recommendations have been made more specific for healthy older adults and older adults with acute or chronic disease (38), see Tables 3A and 3B.
Table 3A
PROT-AGE recommendations for protein intake of healthy older people (38)

<table>
<thead>
<tr>
<th>PROT-AGE recommendations for dietary protein intake in healthy older adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>• To maintain and regain muscle, older people need more dietary protein than do younger people; older people should consume an average daily intake in the range of 1.0 to 1.2 g/kg BW/d.</td>
</tr>
<tr>
<td>• The per-meal anabolic threshold of dietary protein/amino acid intake is higher in older individuals (i.e., 25 to 30 g protein per meal, containing about 2.5 to 2.8 g leucine) in comparison with young adults.</td>
</tr>
<tr>
<td>• Protein source, timing of intake, and amino acid supplementation may be considered when making recommendations for dietary protein intake by older adults.</td>
</tr>
<tr>
<td>• More research studies with better methodologies are desired to fine tune protein needs in older adults.</td>
</tr>
</tbody>
</table>

Table 3B
PROT-AGE recommendations for protein intake of older patients with specific acute or chronic disease (38)

<table>
<thead>
<tr>
<th>PROT-AGE recommendations for protein levels in geriatric patients with specific acute or chronic diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The amount of additional dietary protein or supplemental protein needed depends on the disease, its severity, the patient's nutritional status prior to disease, as well as the disease impact on the patient's nutritional status.</td>
</tr>
<tr>
<td>• Most older adults who have an acute or chronic disease need more dietary protein (i.e., 1.2–1.5 g/kg BW/d); people with severe illness or injury or with marked malnutrition may need as much as 2.0 g/kg BW/d.</td>
</tr>
<tr>
<td>• Older people with severe kidney disease (i.e., estimated glomerular filtration rate [GFR] &lt; 30 mL/min/1.73 m²) who are not on dialysis are an exception to the high-protein rule; these individuals need to limit protein intake.</td>
</tr>
</tbody>
</table>

So far there is only limited evidence to supplement essential amino acids (derivates) such as leucine or HMB (39-41).
For the sake of optimal protein supplementation, it is recommended to exceed the increased splanchnic extraction by providing 25-30 grams of protein per meal (42).

10. Vitamin D and Other Micronutrients

As most older subjects are at risk of vitamin D deficiency, vitamin D should be supplemented to reach minimum serum levels of 50 nmol/l, preferably 65-75 nmol/l. Some countries have specific recommendations. In the Netherlands, for example, all people aged 70 years and older are advised to take vit D supplementation. There is no need for daily supplementation of other micronutrients as long as the diet is complete. However, subjects eating an insufficient diet should be advised to take micronutrient supplementation to reach at least the minimum recommended daily allowance.
11. How to Reach Nutritional Goals

The oral route
In the 2003 Resolution of food and nutritional care in Europe, the council of Europe Committee of Ministers declared that ordinary food by the oral route should be the first choice to correct or prevent undernutrition in older persons. Sip feedings should not be used as a substitute for the adequate provision of ordinary food, and should only be used where there are clear clinical indications. Artificial nutritional support should only be started when use of ordinary food fails or is inappropriate.

One should realise that food consumption in older adults is habit driven. Therefore, changing diets is difficult. Preferably, the adaptations to the diet should fit well in their current consumption habits (43). Replacing energy/protein-low food with energy/protein-dense food, fortification of food, and providing snacks in-between meals are the first steps to improve energy and protein intake. Fortification of meals can be reached by adding extra protein, carbohydrates or fat. Protein can be added in powder form, and adding fat (cream, butter, oil) or carbohydrates (maltodextrins, dextrose) are simple ways to enhance the energetic value of food. By adding these components to the food, there is naturally a sensory limitation to the amount of additional energy or protein that can be achieved. Several studies have however shown that enriching food leads to improved nutritional intake in older patients who do not manage large amounts of food (44-47).

Only recently, focus has been shifting to enriching regular foods (such as milk, bread, juices, cookies and cake). Two recent studies have shown that this is a cheap and feasible way to improve the dietary intake of older persons, with high compliance, and high acceptance of the products, without compensational effects (eating less during other meals because the enriched products have a higher nutritional value) (48).

12. Ambiance

It is known that only a third of patients admitted to hospital eat all the plated food. Not eating full meals has been shown to be predictive for poor outcomes (13). To improve meal experience five aspects can be addressed:
- room (light, sounds, colour, design)
- meeting (between patient and staff but also between patients and presentation of meals)
- products (menu, food and drinks, portion size)
- atmosphere (room, meeting and product)
- management control system (economic and legal aspects, leadership) (49).

Indeed, in a study among 178 nursing home residents ‘family style meals’ improved the intake of the residents. The adaptations were simple but effective: drinking glasses vs. plastic cups, meals served in dishes on table vs pre-plated trays, staff sitting down at tables and chatting with the residents during meals, undisturbed mealtimes (50).
13. Oral Nutritional Supplements

If a patient’s nutritional status does not stabilise or improve with the aforementioned measures, oral nutritional supplements (ONS) should be considered. Although many different products are available, a liquid supplement, high in energy (1.5 – 2.4 kcal/mL) and protein (±10 g/100 mL), will usually be the product of first choice. These products are available with and without fibre. They should be served slightly cooled and between meals or at bedtime in order to improve their observance.

A meta-analysis by Milne and co-workers has shown that supplementation has a statistically significant effect on body weight. However, only in the malnourished subgroup of patients, did supplementation cause the mortality to decrease - by an estimated 20%. The authors estimated that protein-energy supplementation reduced the risk of complications by around 15%. The meta-analysis with respect to the length of stay yielded no indications of an effect. Also, Milne et al. found no indications that muscle strength improved through supplementation (15). It should be mentioned, however, that the quality of the trials included by Milne et al. was poor, leading to uncertainty about the outcomes presented. The results are less strong if only trials of higher methodological quality are considered.

Milne et al. indicate that ONS is only expected to be beneficial if the supplements are taken for a period of at least 3 months, and if the extra energy adds at least 400 extra kcals/day.

When specifically looking at studies addressing the topic of supplementation of protein and energy in older persons with sarcopenia, much of the evidence is based on short-term protein synthesis studies and large clinical trials are still lacking. In these studies, effects are not convincing if not combined with exercise (51, 52).

14. Summary

With the ageing population, malnutrition is becoming an increasingly important problem to be aware of. In older people, multi-morbidity is thought to be the most important cause of malnutrition. Although prevalence rates of malnutrition are highest in hospitals and nursing homes, the absolute highest number of malnourished patients lives in the community. Practical measures to screen, diagnose and treat malnourished older persons should therefore be available for all health care settings.

When obtaining a picture of a patient’s nutrition status, weight, height, involuntary weight loss, appetite and intake seem to be essential components. None of the available and validated screening tools encompass all these items. Therefore, clinical judgement should always remain to play a major role. Still, for reasons of standardisation and practicability, objective (instead of subjective) screening and assessment tools remain very helpful tools as a first step towards identification of malnutrition in older persons. The MNA or its derived short form is the screening tool most frequently used for older persons.

Screening should always be followed by a more thorough assessment of nutritional status. Recently, ESPEN has given consensus based recommendations for the diagnosis of malnutrition. There are two options for the diagnosis of malnutrition. Option one requires...
body mass index (BMI, kg/m²) <18.5 to define malnutrition. Option two requires the combined finding of involuntary weight loss (mandatory) and at least one of either reduced BMI or a low fat free mass index (FFMI). Weight loss could be either >10% of habitual weight indefinite of time, or >5% over 3 months. Reduced BMI is <22 kg/m² in subjects older than 70 years. Low FFMI is <15 and <17 kg/m² in females and males, respectively.

Once a patient is recognized at risk of malnutrition or malnourished, nutritional intervention should be initiated, aimed at stabilising or improving the nutritional status, herewith maintaining or improving independence and functionality, and preventing complications or (re-)hospitalisation. Energy requirements are at least 1500 kcals/day for older women and 1700 kcals/day for older men. Supplementation of 400 kcals per day, on top of usual dietary intake, is needed for nutritional intervention to be effective. Protein requirements of older persons are thought to be 1.0 grams of protein per kilo bodyweight per day for healthy older persons and 1.2 – 1.5 grams for older adults with acute or chronic disease. Vitamin D should be supplemented to reach minimum serum levels of 50 nmol/l, preferably 65-75 nmol/l. Ordinary food by the oral route should be the first choice to correct or prevent malnutrition in older persons. Sip feedings should not be used as a substitute for the adequate provision of ordinary food, and should only be used where there are clear clinical indications. Artificial nutritional support should only be started when use of ordinary food fails or is inappropriate.

It has been shown that improving meal ambiance may be helpful to improve nutritional intake of older persons.

15. References


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