

## NUTRITION AND AGING

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### Definition of malnutrition

Malnutrition is a condition in which a deficiency, excess or imbalance of food and/or food components causes measurable adverse effects on tissue, body form (shape, size and composition), function, clinical outcome and quality of life.

Malnutrition seen as under nutrition is the most frequent form of malnutrition that occurs in older persons.

Protein-energy malnutrition is present when insufficient energy and/or protein is available to meet metabolic demands. Protein-energy malnutrition may develop because of poor dietary protein or calorie intake, increased metabolic demands as a result of illness or trauma, or increased nutrient losses (2).

### Epidemiology

All studies are indicating a high prevalence of malnutrition in the older population. 40 to 50% of non-institutionalised older persons are at a moderate to high risk for nutritional problems

In more selected populations groups its possible to estimate that 9 to 15% of older persons seen in the out-patient clinic, 12 to 50% of hospitalised older persons and 25 to 60% of older persons residing in institutional settings have one or more nutritional inadequacies. Some reports however are more pessimistic and found a prevalence of 60 to 100% in Nursing Homes. (Stratton et al. 2003, King et al. 2004, Abbasi et al. 1991).

With increasing age energy intakes declines significantly, and more than the diminished needs by decrements in the lean body mass and physical activity. In the National Health and Nutrition Examination Surveys the mean daily energy intake was approximately 1600 kcal for men and 1200 kcal for women, and more than 15 percent of older persons consumed less than 1000 kcal/d. In this context of diminished food intake its probable that many of these persons have an imbalanced diet, and have thus a lack of many nutritional components.

### Malnutrition: an unknown problem

Older persons themselves, their families, the professionals who cares for hem are not aware of this problem.

For older people living at home in the community, the local family doctor is the first port-of-call. Yet awareness among family doctors of the symp-

toms and the risk of malnutrition is often alarmingly low. In a survey of UK family doctors about their awareness of malnutrition and use of nutritional support services, there was found that:

- 88% of respondents were not aware of any nutritional screening tool designed to identify patients at risk of malnutrition,
- only 13% always referred a patient at risk, or suffering from, malnutrition to an NHS Dietician,
- 40% never provided dietary advice to patients at risk of malnutrition prior to an elective admission to hospital (3).

According C.Pichard (4) 77% of all patients above 80 years are malnourished.

For most professional and non-professional carers, a dietician is a specialist for special diets, for obesity treatment or treatment of other specified diseases, but is not associated with fight against malnutrition!

### Pathophysiology

Protein-energy malnutrition may occur as a consequence of inadequate intake alone (i.e. starvation) or in association with disease-activated physiologic mechanisms that affect body metabolism, composition, and appetite (i.e. cachexia). In the former (primary caloric deficiency state) the body adapts by using fat stores, while conserving protein and muscle, and the resulting physiologic changes are often reversible with resumption of usual intake and activity. Cachexia is marked by an acute phase response that is associated with elevated inflammatory mediators (e.g. tumor necrosis factor- $\alpha$  and interleukin-1) and increased protein and muscle degradation that may not be readily reversed by refeeding. Although cachexia is usually associated with specific chronic disease conditions (g. cancer, infection, inflammatory arthritis) this state may develop in older persons without obvious disease (5).

Older persons may be at greater risk of not being able to recover from malnutrition once installed. (Pirlich et al.) (6)

### Who is at risk for malnutrition?

Are at risk for malnutrition all (older) persons with a physical handicap or a cognitive deficit, living alone, or in institutions or in a hospital. All these persons are really at risk because they are not able to get and prepare the foods (they prefer).

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hospital are at risk, because generally the first aim of a hospital is not to give the excellent food of a first class restaurant, but deliver excellent technical medical care.

The poverty of many very old persons is also a treat to the nutritional state. In some situations people have to make a choice between food, paying their house rent, or the expenses of social contacts, etc.

### Causes of malnutrition in the older persons

The causes of malnutrition can be divided in three categories: Social, economical and health related.

The social causes are numerous. Living alone is a common cause of malnutrition. Living alone means there is less stimulation to prepare good meals. For one person it's indeed a lot of work, and they eat only some foods not requiring a lot of preparation, and many times with the same content. A meal is more enjoyable when taken with other persons too. Living alone with a handicap or with cognitive deficit can make difficult to get the necessary ingredients to prepare the meal. The cooking process is also more difficult in these cases.

The economical aspects are also very important. It's well known that in many countries the incomes of the very old are not correlated with the increase of the expenses of the daily life. Poverty and long-standing retirement situation are situations to be aware of potentially malnutrition on economical grounds.

The health related aspects are better known, but some are generally forgotten as the poor oral and dental situation, or situation of depression and cognitive disorders that are both frequent in the very old. The diminution of the taste and smell is also an important factor in developing malnutrition. Some drugs are also important factors in the development of malnutrition (SSRI, digoxine, etc.).

In hospitals many patients have not their estimated nutritional provided for, despite sufficient food provision (Dupertuis et al.) (7). Since insufficient food intake was often attributed to causes other than disease, there should be potential to improve the hospital meal service. More than 40% of hospital food is wasted (Barton AD et al.) (8).

The situation is not better in Nursing Homes: It may be possible to get enough energy and most nutrients from the served food, but many elderly nursing homes residents did not eat enough (Suominen M et al.) (9).

### Detection of malnutrition

Many easy to perform tests are now available to detect malnutrition:

- MNA, (Mini Nutrition Risk Index) - attach 1\*
- MUST, (Malnutrition Universal Screening Tool)\*\*
- GNRI (Geriatric Nutritional Risk Index)

The Geriatric Nutritional Risk Index (GNRI) =

$(1.489 \times \text{albumin, g/l}) + (41.7 \times \text{present/ideal body weight})$ .

Ideal body weight (Broca):

Men = Standing height in cm - 100

Female = (Standing height in cm - 100) - 5%

Measurement of Standing height by knee height (10):

Men =  $96,50 + (1,38 \times \text{knee height}) - (0,08 \times \text{age})$  cm

Female =  $89,68 + (1,53 \times \text{knee height}) - (0,17 \times \text{age})$  cm

*Recommendations from the inaugural Conference of the European Nutrition for Health Alliance (London, 14th September 2005).*

### Detection

- Adopt measuring tools for nutritional/oral intake/clinical signs of malnutrition.

*The absence of a universally-preferred screening tool for malnutrition has frustrated attempts to develop policy solutions. Ideally, such a screening tool should be adopted across Europe, so as to better enable cross-border comparison and learning.*

- Universal mandatory malnutrition screening for older people must be adopted.

*Screening should target older people where they are most vulnerable, in secondary care, residential care and in the community. Screening tools such as the "Malnutrition Universal Screening Tool" should be used with older people. Nutritional assessment should be incorporated into all geriatric assessment.*

- Define and identify at risk groups.

*Certain groups among the older persons are at particular risk of malnutrition. Research to identify these groups should be undertaken, and the results distributed among health and social care professionals.*

*Recommendations from the inaugural Conference of the European Nutrition for Health Alliance (London, 14th September 2005).*

### Awareness

- Malnutrition should be recognised as a primary disease.

*Malnutrition, currently, is not on anyone's radar. It is not recognised as a significant problem of public health, nor as a preventable social phenomenon nor as a significant health risk in ageing populations. To receive the attention it needs, malnutrition must be recognised as a primary disease which warrants proactive detection, dedicated health promotion, and comprehensive treatment guidelines. Building it within this framework would prevent it from being "forgotten" as is currently the case. It would also stimulate professional awareness and scientific research.*



# Mini Nutritional Assessment MNA®

Last name: \_\_\_\_\_ First name: \_\_\_\_\_ Sex: \_\_\_\_\_ Date: \_\_\_\_\_

Age: \_\_\_\_\_ Weight, kg: \_\_\_\_\_ Height, cm: \_\_\_\_\_ I.D. Number: \_\_\_\_\_

Complete the screen by filling in the boxes with the appropriate numbers. Add the numbers for the screen. If score is 11 or less, continue with the assessment to gain a Malnutrition Indicator Score.

**Screening**

**A** Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?  
 0 = severe loss of appetite  
 1 = moderate loss of appetite  
 2 = no loss of appetite

**B** Weight loss during the last 3 months  
 0 = weight loss greater than 3 kg (6.6 lbs)  
 1 = does not know  
 2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs)  
 3 = no weight loss

**C** Mobility  
 0 = bed or chair bound  
 1 = able to get out of bed/chair but does not go out  
 2 = goes out

**D** Has suffered psychological stress or acute disease in the past 3 months  
 0 = yes      2 = no

**E** Neuropsychological problems  
 0 = severe dementia or depression  
 1 = mild dementia  
 2 = no psychological problems

**F** Body Mass Index (BMI) (weight in kg) / (height in m<sup>2</sup>)  
 0 = BMI less than 19  
 1 = BMI 19 to less than 21  
 2 = BMI 21 to less than 23  
 3 = BMI 23 or greater

Screening score (subtotal max. 14 points)

12 points or greater Normal – not at risk – no need to complete assessment  
 11 points or below Possible malnutrition – continue assessment

**Assessment**

**G** Lives independently (not in a nursing home or hospital)  
 0 = no      1 = yes

**H** Takes more than 3 prescription drugs per day  
 0 = yes      1 = no

**I** Pressure sores or skin ulcers  
 0 = yes      1 = no

Ref. Vellas B, Wilks H, Abellan G, et al. Overview of the MNA® - Its History and Challenges. J Nutr Health Aging 2005;10:435-465.  
 Rubenstein LZ, Haber JC, Selva A, Gulmez Y, Vellas B. Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini Nutritional Assessment (MNA-SF). J Gerontol 2001;56A: M360-377.  
 Gulmez Y. The Mini-Nutritional Assessment (MNA®) Review of the Literature - What does it tell us? J Nutr Health Aging 2005;10:466-497.

© Nestlé, 1994, Revision 2006. N67200 12/09 10M  
 For more information: www.mna-elderly.com

**J** How many full meals does the patient eat daily?  
 0 = 1 meal  
 1 = 2 meals  
 2 = 3 meals

**K** Selected consumption markers for protein intake  
 • At least one serving of dairy products (milk, cheese, yogurt) per day    yes  no   
 • Two or more servings of legumes or eggs per week    yes  no   
 • Meat, fish or poultry every day    yes  no   
 0.0 = if 0 or 1 yes  
 0.5 = if 2 yes  
 1.0 = if 3 yes

**L** Consumes two or more servings of fruits or vegetables per day?  
 0 = no      1 = yes

**M** How much fluid (water, juice, coffee, tea, milk...) is consumed per day?  
 0.0 = less than 3 cups  
 0.5 = 3 to 5 cups  
 1.0 = more than 5 cups

**N** Mode of feeding  
 0 = unable to eat without assistance  
 1 = self-fed with some difficulty  
 2 = self-fed without any problem

**O** Self view of nutritional status  
 0 = views self as being malnourished  
 1 = is uncertain of nutritional state  
 2 = views self as having no nutritional problem

**P** In comparison with other people of the same age, how does the patient consider his/her health status?  
 0.0 = not as good  
 0.5 = does not know  
 1.0 = as good  
 2.0 = better

**Q** Mid-arm circumference (MAC) in cm  
 0.0 = MAC less than 21  
 0.5 = MAC 21 to 22  
 1.0 = MAC 22 or greater

**R** Calf circumference (CC) in cm  
 0 = CC less than 31      1 = CC 31 or greater

Assessment (max. 16 points)

Screening score

Total Assessment (max. 30 points)

**Malnutrition Indicator Score**

17 to 23.5 points      at risk of malnutrition

Less than 17 points      malnourished

\*MNA (Mini Nutrition Risk Index) - attach 1.

