



Nutrition and Hydration

8

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Malnutrition and dehydration are important aspects of the care of older people, particularly those in hospitals or in long-term care facilities. Many older people do not eat and drink adequately during hospital stays and, following hip fracture, many patients achieve only a half of their recommended daily energy, protein and other nutritional requirements [1]. This leads to poor recovery and diminished health status and functional ability and results in a higher risk of other complications (Chap. 6).

Nurses are the coordinators of the care process, so it is essential that they bring other health-care specialists together as a team to collaboratively provide high-quality care that reflects patients' needs for assessment, intervention and health promotion. When an interdisciplinary team (orthogeriatric collaboration) work together care is more successful, improves patient outcomes and reduces the risk of the in-hospital and long-term mortality.

The aim of this chapter is to increase awareness of nurses' responsibility, within a multidisciplinary team, for assessment and intervention of nutrition and hydration, examine the issues pertaining to nutrition and fluid balance in older people and outline the nature, assessment and interventions relating to malnutrition and dehydration.

8.1 Learning Outcomes

At the end of the chapter, and following further study, the nurse will be able to:

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- Identify those at risk of malnutrition and dehydration
- Prevent complications of poor nutrition and dehydration through effective intervention and health promotion
- Identify the nurse's role in coordination of the interdisciplinary team to best meet patients' needs.

8.2 Healthy Diet for Older Adults

In developed countries, people are currently consuming more food high in energy, fats, sugars and salt than in previous decades. While undernutrition leads to a higher risk for health problems, obesity also increases morbidity and mortality from diabetes, hypertension and cardiovascular diseases. To change unhealthy behaviour, education about healthy lifestyles is necessary. A healthy diet prevents malnutrition in every form. A healthy diet for adults contains [2]:

- At least 400 g (5 portions) of fruit and vegetables a day
- Less than 10% of total energy intake from free sugars (equivalent to 50 g for a person of healthy body weight consuming approximately 2000 calories per day)
- Less than 30% of total energy intake from fats; unsaturated fats (e.g. fish, avocado, nuts, olive oil) are preferable to saturated fats (e.g. in fatty meat, butter, palm and coconut oil)
- Less than 5 g of salt per day and use iodised salt.

The recommended daily fluid intake for people over the age of 65 years is 2250 ml. This consists of approximately 60% direct fluid (from drinking) and approximately 40% of indirect fluid (from food and oxidation) [3]. In the case of kidney or heart diseases or other health problem that necessitates restriction of fluid intake, a physician should be involved in calculating the appropriate amount of daily fluid required. Older people, especially those recovering from fracture and surgery, have fluctuating metabolic needs and health practitioners must ensure that sufficient energy and other nutrients are available for recovery and wound healing.

With increasing age, physiological and psychological changes increase the incidence of chronic diseases, fractures and disabilities due to the changing metabolism and lack of knowledge of individuals about appropriate strategies to prevent malnutrition [4]. While the requirement of nutrition (e.g. carbohydrates and fats) decreases with older age, the requirement of vitamins and minerals is stable [5]. Most patients in hospitals are over the age of 60 years. Therefore, it is essential that they have a diet with less energy but rich in nutrition and that this is altered to a diet higher in energy when they are ill or recovering from fractures and surgery. This decreases the risk of falls, fractures and osteoporosis and supports recovery and healing.

Table 8.1 Dietary sources of calcium

Main sources of calcium (250 mg)	Additional sources of calcium (100 mg)
200 ml milk	100 g broccoli
180 g yoghurt	100 g leguminous plants (dry weight)
30 g hard cheese	300 g granary bread
60 g soft cheese	40 g almonds
200–250 g curd	25 ml calcium rich mineral water

Nurses must be aware of this baseline information so that they can educate patients and carers about healthy eating and fluid intake. If patients need more detailed support with their individual nutrition status, other members of the interdisciplinary team should be involved, such as dieticians, and written resources provided.

8.3 Calcium and Vitamin D

Two crucial factors in bone health are calcium and vitamin D; vitamin D is essential for the uptake and absorption of calcium. The recommended daily amount of calcium for people over 65 years is 1000 mg [6]. Table 8.1 shows the main sources of calcium with minimum amounts of 250 mg and 100 mg calcium, which should be a regular part of meals to meet the needs.

Vitamin D is a fat-soluble vitamin which is important for calcium uptake in bones, especially in later life. Food contains small amounts of vitamin D, but the production of vitamin D takes place in the skin under the influence of ultraviolet (UV) light. Production of vitamin D is limited where sunshine is depleted, e.g. in northern Europe and northern North America, particularly in winter. The capacity to produce vitamin D decreases in older age by four times, resulting in lower levels of vitamin D [7]. It is recommended to expose the hands, arms and face to sunlight for approximately 5–25 min per day, but this is limited during hospitalisation and by other social factors, so supplementation should be prescribed. The recommendation for an adequate supplementation of vitamin D intake for older people is 800–1000 IU per day [8] and it should be taken with main meals [9].

Although nutrition is important in preventing osteoporosis-associated fractures, it is also essential for maintaining the positive effects of weight-bearing activity and exercise training on bone density [10]. Regular physical activity of 30 min per day promotes calcium resorption and supports muscle growth and bone density [11]. Following hip fracture, patients should be encouraged to participate in daily activity as a part of their discharge plan, supported by inpatient or outpatient rehabilitation programmes. If patients are independent in activities of daily living and do not suffer from other health problems or disabilities which limit physical activity, additional information about specific exercises and activities should also be provided.

8.4 Malnutrition and Dehydration

To identify and treat patients with malnutrition or dehydration, nurses must know how malnutrition and dehydration is defined. According to NANDA [12], malnutrition is: 'Intake of nutrients insufficient to meet metabolic needs'. The criteria for malnutrition are [13]:

- Body mass index (BMI) < 18.5 kg/m²
- Unintended weight loss >10% in the last 3–6 months
- BMI < 20 kg/m² and unintended weight loss >5% in the last 3–6 months
- Fasting period >7 days (additional criterion).

The definition of dehydration is more complex as it can refer to both loss of body water and volume depletion following the loss of body water; it is suggested [14] that it is defined as a complex condition resulting a reduction in total body water. This can be related to both total water deficit ('water loss dehydration') and combined water and salt deficit ('salt loss dehydration') due to both too low intake and excessive/unbalanced excretion.

8.4.1 Prevalence

The prevalence of malnutrition in care facilities differs widely depending on location. Especially in geriatric wards, where the prevalence is higher than on coronary wards [15]. The estimated number of patients with malnutrition is approximately 35% with 30–55% admitted to acute hospitals being at risk of malnutrition [16].

The reported prevalence of dehydration also varies and depends on which definition of dehydration and which research methods are used. It is estimated that 40% of people newly admitted to hospital are dehydrated and 42% of patients who were not dehydrated at admission were dehydrated 48 h later. Because people who live in residential institutions are very frail, dehydration is estimated to be 46% in these settings [14].

8.4.2 Symptoms of Malnutrition and Dehydration

The symptoms of malnutrition vary and may manifest as weight loss, low energy levels, lethargy, low mood and depression, abdominal cramps or abdominal pain, diarrhoea, limited/reduced muscle tone (sarcopenia) and/or lack of interest in or aversion to eating/drinking.

The signs of dehydration are seen earlier than malnutrition; common symptoms include increasing heart rate, diminished urine output, nausea, dry lips, spasm, unexplained mental confusion [17] and, sometimes, pale mucosa [18].

8.4.3 Screening and Assessing Patients for Malnutrition

Of the range of validated screening and assessment instruments that exist, few have been shown to be valid and reliable including the 3-minute nutrition screening (3MinNS), the Nutritional Risk Screening 2002 (NRS-2002), the Mini Nutritional Assessment (MNA), the Malnutrition Universal Screening Tool (MUST), the Malnutrition Screening Tool (MST—cut off >2) and unwanted weight loss (more than 5% in the last 6 months) [19, 20]. The selection of an appropriate and validated screening instrument should be made according to the patient setting and with common underlying health issues in mind, and multidisciplinary teams need to decide on the best tool for their specific setting.

It is important that the identification and collection of information about people at risk of malnutrition follow two steps:

1. *Screen* all patients within 24 h of admission to identify risk factors for malnutrition.
2. *Assess* all patients at risk for a comprehensive understanding of the problem to enable planning of appropriate interventions.

The risk factors for malnutrition vary between clinical settings and patient groups. Table 8.2 lists common risk factors relating to general and setting-specific factors [21]:

Table 8.2 Main risk factors for malnutrition [21]

General factors	Specific risk factors
Due to illness, therapy and age-related limitations	Hospital
<ul style="list-style-type: none"> • Acute and chronic illness • Multimorbidity • Side effects of medication • Cognitive impairment • Functional decline • Dysphagia and other eating difficulties 	<ul style="list-style-type: none"> • Illness that affects food intake (e.g. major abdominal surgery) • Fear of diagnosis • Unusual environment • Aversion to hospital food • Interruption of mealtimes
Due to psychosocial limitations	Outpatient care
<ul style="list-style-type: none"> • Depression • Loneliness and social isolation • Socioeconomic problems • Fears and anxieties • Anorexia 	<ul style="list-style-type: none"> • Limitation on food supply • Limitation to leading an independent life • Limitation to eat independently • Social isolation, loneliness, depression
Due to the environment	Long-term care
<ul style="list-style-type: none"> • Inflexible mealtimes • Inappropriate help • Disturbance during mealtimes • Unmet need for support 	<ul style="list-style-type: none"> • Interference from the surroundings • Disturbance from other residents • Shame • Wishes not expressed • Aversion to meals and beverages

If there is at risk of malnutrition, the information obtained from screening and assessment should be used to achieve a comprehensive understanding of the individual issues as part of the CGA process to facilitate an individualised plan for avoiding or treating malnutrition. This should include:

- Involvement of family and carers to understand the patient's normal nutritional status and needs.
- Collaboration with members of the interdisciplinary team such as dietitians, physicians, dentists or occupational therapists.
- Discussion with patients, family and carers about the assessment and intervention plans. In case of end-of-life care, the application of artificial nutrition should be discussed in respect of the principles of Bioethics including beneficence, non-maleficence and justice with full consultation the patient, his relatives and the interdisciplinary team.
- Ensure the further treatment of the problem within the discharge management.

8.4.4 Evidence-Based Interventions to Prevent and to Treat Malnutrition

Malnourishment or risk of malnutrition should be approached as a multifactorial problem. It is important that interventions to prevent malnutrition begin with recording a nutrition history and monitoring the patient's food intake during the first days after admission. The treatment of malnutrition can be divided into several specific aspects:

Arrangements for food and meals: Meals in hospitals, and particularly in long-term care facilities, are often tasteless. To improve the taste, nurses should liaise with those responsible for the cooking of meals. Changes in the nature and variety of food or the use of flavoursome sauces are simple and cheap ways to improve taste. As well as the usual timed meals, snacks should be offered by staff or, as self-service, made easily accessible for patients over 24 h. Food should reflect the patient's preferences. For those with physical or psychological difficulties with eating, nurses should assist with the use of appropriate aids (e.g. large handles on cutlery, coloured glasses for visually impaired patients) to help increase independence. Where there are specific problems such as difficulty swallowing or poor dentition, other professionals should be involved as physicians, speech therapists and dentists to address the problem [22].

Dietary supplements: Patients with difficulty eating adequate amounts of food should be offered multi-nutrition supplements with high-protein content (0.9 to 1.2 g/kg/day). Dietary supplements (enteral nutrition) are liquid foods that are used to improve nutritional intake [23]. This is particularly important in frail older people in the perioperative period as there is evidence that dietary supplements, especially for older patients with hip fractures, have a positive effect on quality of life and

help to reduce complications [24–26]. To support muscle strength gain during recovery and rehabilitation, high-protein supplements should be combined with muscle resistance training exercise with the physiotherapy team. Patients should be informed about the reason for supplementation and be asked about their preferences in the taste or temperature of the supplement. If patients have intolerances or problems eating and drinking because of the taste, a dietician should be involved. Physicians should be reminded of the need for vitamin D supplementation. Providing information material about healthy diet and fluid intake in older age, particularly about the requirement for minerals and vitamin D, is essential during discharge management.

Interaction during mealtimes: Patients are often highly dependent on the help of nurses, especially those with cognitive or functional decline who are already most at risk of malnutrition, so nurses should consider individual needs for support with eating. Creating a culture in which mealtimes are times of calm with as few interruptions as possible can increase the likelihood that patients eat well [27]. It is also important that enough help is available at mealtimes to support eating and that families are encouraged to be involved.

Environmental and personal requirements: The environment in hospitals and residential facilities can be unfamiliar and impersonal. Mealtimes are important human interaction opportunities normally conducted in pleasant, comfortable surroundings conducive to appetite. Nurses should involve support workers, volunteers and families in creating a pleasant environment for eating, considering issues such as adequate table decoration adapted to the seasons to help patients to be more orientated, feel more comfortable and increase the likelihood of them eating well [28].

Education, support and guidance: Patients and families can be unaware of the problems and the consequences of malnutrition, so education, information, support and guidance are important in engaging patients and carers in eating well. Information needs to be individualised and can be provided in a variety of ways. Some people prefer written information (e.g. leaflets, visual aids or posters), while others prefer technological approaches such as apps on smartphones and/or Internet-based information.

8.4.5 Hydration and Dehydration

Dehydration is common among hospitalised older adults with significant adverse consequences. The screening of those at risk of dehydration is challenging because of the unspecific symptoms and the rapid progress. Box 8.1 lists the main risk factors of dehydration.

8.4.5.1 Screening and Assessing Patients with Dehydration

To identify people at risk of dehydration, nurses should follow the same procedure for the risk of malnutrition. However, unlike malnutrition, there are no validated

Box 8.1: Risk Factors for Dehydration

- Low BMI
- Depleted thirst
- Dependent on care
- Cognitive impairment
- Frailty and comorbidities
- Neurological deficits such as hemi- and paraplegia
- Dysphagia
- Constipation, diarrhoea, vomiting and incontinence
- Fear of incontinence and reluctance to drink
- Taking potassium-sparing diuretics

screening tools, so nurses need to use their knowledge and skills to make individualised assessments by:

1. *Screening* all patients within 24 h of admission to identify risk factors for dehydration.
2. *Assessing* all patients at risk to enable a comprehensive understanding of the problem and a plan of appropriate measures to be devised.

As well as considering the risk factors identified in Box 8.1, criteria for positive risk screening of people for dehydration may include [29]:

- Fatigue and lethargy
- Not drinking between meals
- BIA (bioelectrical impedance analysis) resistance at 50 kHz (BIA assesses electrical impedance through the body commonly from the fingers to the toes and is often used to estimate body fat)

Additional screening tests with limited diagnostic accuracy include:

- Decreasing drink intake
- Diminished urine output
- High urine osmolality
- Low axilla moisture (dry armpits).

8.4.5.2 Assessment and Further Action

If the patient is dehydrated, or at risk of dehydration, screening should achieve a comprehensive understanding of the underlying issues and generate a plan of appropriate measures to treat or prevent dehydration. This should include:

- Close monitoring of both fluid intake and urinary and other fluid output such as vomiting or wound drainage

- Ensure toileting facilities are easily accessible, and if not, or patient's physical activity is limited, use aids such as urine bottles or commodes
- Involvement of the patient and family/carers in the assessment and plan of care, including encouraging fluid intake of approximately 2250 ml per day (direct and indirect fluid) if not contraindicated
- Involvement of other members of the team such as physicians and ensuring that the whole of the nursing team, including support workers/carers, are aware of the risks and the need to closely monitor fluid intake and supplement as required
- Discuss with patients and their family/caregivers the risks, plan of care and aims of care in terms of volume of fluid required and engage family in supporting the aims
- Ensure the problem is included within the discharge plan.

8.4.5.3 Evidence-Based Interventions to Prevent and Treat Dehydration

Patients' oral fluid intake is often inadequate, especially early in the patient pathway while fasting and undergoing perioperative preparation. It is essential to closely monitor and document fluid intake and output and to supplement intake, where necessary, with intravenous fluids.

Prevention aims to ensure the availability of drinks that are pleasant to drink and that patients and families understand for the necessity to drink. Support and help are needed to facilitate adequate intake of oral fluids with the following advice in mind [30]:

Availability of drinks: Drinks should be constantly and easily available. Frequent regular drinks 'rounds' should take place; to support nurses, volunteers or assistants may be given responsibility for this activity. Nursing activities can act as prompts to support patients with drinking oral fluids such as during medication rounds.

Drinking pleasure: Taking pleasure in drinking depends on individual preferences including types of fluid, temperature and flavour. Asking patients/families about preferences and considering factors that can support fluid intake such as reminders to drink and social interaction can be useful.

Support and help to drink: Offering individualised support to patients to help them to drink can encourage adequate fluid intake. This should be done in a friendly, unhurried and calm manner using appropriate drinking aids such as straws and special cups or with bottle-clipped systems. Family often feel helpless but may be able to help with drinking so that they feel involved and useful. Family members can be offered information including how to recognise dehydration and how to help with drinking.

Monitoring and understanding of the necessity to drink: Nurses should provide appropriate information so that patients understand the benefit of adequate fluid intake. Accurately monitoring and recording intake and asking patients/families about the baseline daily fluid intake are essential. All involved need to be aware of the outward signs of dehydration such as:

- Diminished urine output and concentrated urine
- Dry lips, mucous membranes, diminished skin turgor
- Muscle weakness, dizziness, restlessness, headache.

8.5 Summary of Main Points for Learning

- Older people who are hospitalised with a fracture are often overwhelmed and find it difficult to follow a healthy diet and fluid intake.
- The care process begins with screening and monitoring nutritional status and fluid intake of all older people within 24 h of admission.
- To prevent or treat malnutrition or dehydration, the issue should be discussed within the multidisciplinary team to ensure that everyone is aware of the problem and is involved in planning appropriate interventions.
- All patients at risk of malnutrition and dehydration should be assessed to provide a comprehensive understanding of the problem.
- Observation and documentation of nutrition and fluid intake and output should be conducted at least for the first days after admission.
- Patient needs should be discussed with other professions so that appropriate team-based interventions can be planned.
- It is important to involve the patient and family within the care process.
- Appropriate and appealing meals, snacks and drinks for older people should be available and offered with recommended amounts of water, protein, vitamins and minerals (particularly calcium); this should be complemented with supplementary drinks if intake is not adequate.
- The prescription of vitamin D should be discussed with the patient's physician.
- Patient-centred and evidence-based information should be provided and interventions in case of end-of-life care should be appropriate discussed.
- Educating, informing and involving patients and families increases their level of health literacy.
- Malnutrition and/or dehydration management should be included in the discharge plan.

8.6 Suggested Further Study

- Access and read the following review paper. Make some notes about ways in which the paper's conclusions could impact on your practice and that of your team:
Sauer A et al. (2016) Nurses needed: Identifying malnutrition in hospitalized older adult. *NursingPlus Open* <https://doi.org/10.1016/j.npls.2016.05.001>
- Find out what nutritional guidelines are available in your own region. Read them carefully and think about how these could be used, to develop simple strategies for improving diet and fluid intake in your patients and discuss this in your team.
- Undertake an audit of nutrition and fluid charts of patients who are at risk of malnutrition or dehydration. Discuss with the team, including a dietician, whether you are adequately recording intake and output. Reflect on the implications of this has what you could do to improve this practice.

- Develop an information leaflet for patients/families about why and how patients can make sure they get enough to eat and drink. Discuss this within the team.
- Talk with patients/carers/staff about the things they feel that prevent good diet and fluid intake for patients. Reflect on what these conversations suggest about how practice might be developed to improve patient's nutrition and hydration status.

8.7 How to Self-Assess Learning

To identify learning achieved and the need for further study, the following strategies may be helpful:

- Examine local documentation of nursing care regarding nutrition and hydration, and use this to assess your knowledge and performance.
- Seek advice and mentorship from other expert clinicians such as dietician, and seek their help to keep up to date on new evidence and disseminate to your team.
- Peer review with colleagues can be used to assess individual progress and practice but should not be too formal. There should be open discussion within the team. Weekly case conferences regarding patients with nutrition and hydration problems can identify nurse-focused issues and enable the exchange of expertise. Expertise is conveyed to the various members of the multidisciplinary team by educational initiatives and by fostering a culture where all the patients' problems are considered.
- Seek feedback from colleagues, patients, carers and other members of the team.

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